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Science after Stalin: Forging a New Image of Soviet Science

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Argument

Post-Stalinist reforms resulted in dramatic changes in the ways of operation of Soviet science: one can say that they altered the very understanding of what science was, or should be, in the socialist society. A new vision came about as a result of political and rhetorical efforts of scientists, who pushed forward their various, often conflicting, agendas acting in accordance with specific rules of Soviet polity. The most visible part of the reform came with the 1961 administrative reorganization of the USSR Academy of Sciences. The related series of changes, however, was much broader and comprehensive, modifying the relationships between science and ideology, politicians and academic researchers, and establishing the very division between fundamental and applied research, which had been strongly rejected during the preceding Stalinist period.

"Stalinist science" has been the topic of several scholarly investigations, but finding a satisfying definition turned out to be not a very simple task.[1] Rather than attempting yet another definition of Stalinist science, I will start by looking at its ideal image, or how the specific nature of Soviet science was described and presented by historical actors in Stalin's time. Perhaps no other author managed to express that ideal better that S. I. Vavilov, president of the USSR Academy of Sciences from 1945 to 1951.[2] In several articles published during the years of his presidency, Vavilov defined the main characteristics of Soviet science that distinguished it from the science of other epochs and societies (Vavilov 1946; 1947; 1949). According to Vavilov, Stalinist science is, first of all, a science of the people and for the people (*narodnaya nauka*), because "it is entirely directed towards serving the people, and because the broad participation of people from factories and kolkhozy has changed its ranks" (Vavilov 1949, 11). Secondly, Soviet science is a Party science (*partiynaya nauka*): "It moves and grows in the directions which were chosen as the most essential ones by the leadership of the Soviet people – the Communist Party and its greatest leader I. V. Stalin" (ibid., 12). The third characteristic of Soviet science, according to Vavilov, is

[1] Important publications on the topic include Graham 1993; Joravsky 1970; Josephson 1981; Kneen 1978; Krementsov 1997; Medvedev 1978; Vucinich 1984. See also D. Joravsky's critical review of Krementsov's book (Joravsky 1997).
[2] On S. I. Vavilov as president of the Stalinist Academy, see Kojevnikov 1996.

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"its definite materialistic basis and practical orientation." The permanent and unbreakable linkage between science and practice, writes Vavilov, makes science "a powerful tool for the material production in socialist society." Finally, "Stalinist science has become a planned science (*planovaya nauka*), which distinguishes it from the disorderly and haphazardly growing science of the capitalist world" (ibid., 14–15).

Both the image and related practice of science were transformed after Stalin's death in March 1953. The changes in political leadership obviously inspired some reevaluations of the existing policies, not only on the part of the Politburo and top Soviet officials, but also on the part of various interest groups, including scientists. By mid–1953, several individual academics had begun to propose certain improvements and reforms, and some minor corrections were already underway (Commission 1954; Kukarkin 1954; Presidium 1954a; Sukachëv 1954). The internal debate about the direction of reforms and their course continued for several years, producing as its most explicit outcome a major administrative reorganization of the Soviet Academy of Sciences in 1961. The basic elements of the 1961 reform were covered in the Soviet media and subsequent Western analysis (Graham 1967, 1993; Lubrano Greenberg 1973; Löwenhardt 1981), but a real archival study has only become possible recently, after the major Soviet political archives were opened. The present paper relies in its analysis on unpublished memoirs, letters, and minutes of meetings from the archives of the Communist Party, the Soviet Academy of Sciences and its Presidium, as well as on some recently published recollections. The story reveals how scientists, in particular nuclear physicists, used their increased political capital and social status to push for a major change in the political organization and management of science. In the end, they essentially succeeded in imposing their own specific agenda on the Communist Party leaders, but in doing so, they acted not as a resisting or protesting opposition, but as insiders, conscious and loyal participants in the Soviet polity.

The story is more than just a case of internal institutional and political maneuvering, and the outcome was not limited to administrative reform, however important, of the main institution of Soviet science. In the process, more fundamental results were achieved, which essentially undermined the very basic definitions of Soviet science, as it was understood during the Stalin period. One of the most important of such results was a reversal in the relationship between science and ideology. Previously, science was supposed to adapt, at least superficially, to the demands of the official philosophy of dialectical materialism, but after the debates of the 1950s, it became the task of the philosophers to adapt their interpretations, at least superficially, by incorporating the lessons of the newest scientific achievements. Another, perhaps even more important result concerned the relationship between science and practice. Stalinist science, as defined by Vavilov, was expected to serve the goals of industrial and economic development of the country. The post-Stalin reformers succeeded in designing and establishing a new concept of "fundamental science," which justified institutional alienation of the most advanced academic

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research from the process of technological modernization. Taken together, these and other simultaneous changes signified an entirely different conceptualization of science, its goals, functions, and expected services. This paper studies how exactly it became possible to quietly undermine the Stalinist system from within, what political and ideological compromises were necessary, what rhetorical strategies were employed, and where scientists succeeded, and where not.

1. Kapitza's Proposal

A key principle of the Stalinist science policy was "the unity of science and praxis" in Marxist terms, or the requirement that the production of scientific knowledge be closely linked to the industrial and economic needs of the society. The academician P. L. Kapitza (Kapitsa)'s life in science can be seen as a perfect realization of this thesis. During the 1930s and 40s, Kapitza worked on low temperature physics while simultaneously inventing devices for the industrial liquefaction of oxygen and other gases. This work brought him high recognition in academic circles later resulting in a Nobel Prize, as well as a number of government awards and decorations, including the highest civilian title "The Hero of Socialist Labor" in 1945. During the same year, Kapitza joined the work on the Soviet atomic project, but tensions with the project's administrative head, the Politburo member L. P. Beria, led to his dismissal from almost all official positions and to his de-facto house arrest between 1946 and 1953. After Beria lost his bid for power in the post-Stalin Politburo, Kapitza started writing letters to the Party's new General Secretary, N. S. Khrushchev and to the Prime Minister G. M. Malenkov, trying to make his way out of official disfavor (Kozhevnikov 1991). His letters included proposals of some military-related inventions, as well as a number of general suggestions on improvements and reforms in Soviet science. One such suggestion, in a letter Kapitza sent to Khrushchev on 12 April 1954, dealt specifically with the issue of the "connection between science and practice."

Without acknowledging that he was essentially revising a basic Marxist principle, Kapitza argued that "advanced science does not trail practice, but creates by itself new directions in the development of culture and, by doing this, changes our way of life." He corroborated the idea with an example from nuclear physics: "let us remember the years when our practical workers scorned the science of atomic nucleus because they did not believe that it would lead to a genuine and quick application. Mankind would have never found the means for using atomic energy had it subordinated science to the recipe of narrow practicality." The political lesson, according to Kapitza, was that it had become necessary to start paying attention first and foremost to the "fundamental theoretical problems of science." He thought that in that area Soviet scientists lagged particularly behind their Western peers, and that a general change in the conditions for scientific work in the country was needed to overcome the gap. Kapitza did not offer very specific recommendations, but vaguely indicated

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the need for broad reform of the Soviet academic establishment (Kapitsa [Kapitza] 1989, 305).

This suggestion fell on receptive ground. After Stalin's death, the new leaders of the Communist Party themselves were trying to reform the Soviet system, although hesitantly and without knowing precisely what exactly had to be changed and how.[3] They were thus relatively open to possible "signals from below" that could recommend certain modifications and deviations from the official dogma of the Stalin era. The Central Committee apparatus apparently took a favorable view of Kapitza's letter and passed it on to the Presidium of the Academy of Sciences requesting that they discuss the issues raised by the academician and draft a proposal. A representative of the Central Committee's Science Department A. Cherkashin attended the meeting of the Academy's Presidium on 4 June 1954, when the issue was discussed (Cherkashin 1954; Presidium 1954b).

Members of the Presidium were confused. On the one hand, the majority of them agreed that fundamental theoretical problems of science had been held in relative disregard. On the other hand, Kapitza's suggestion seemed too radical and dangerous a deviation from what was still regarded as the official party line. The somewhat dyslexic President of the Academy A. N. Nesmeyanov expressed the general confusion in an awkward phrase: "Not a single editorial in *Pravda* has oriented us toward big science," which for some of the party apparatchiks sounded as if Nesmeyanov had tried to criticize the official party mouthpiece (Cherkashin 1954, 107). In fact, Nesmeyanov was obviously frightened by Kapitza's suggestion that the relationship between science and practice be reversed, which contradicted the entrenched key principle of Marxism and of the Stalinist science policy. Neither he nor other Presidium members dared to openly support this major heresy and formulate any definite recommendation. Kapitza's second proposal, however, "to consider changing the conditions for scientific work," met with the Presidium's full approval. Almost all academicians supported it in one way or another and, finally, the Presidium decided to draft a resolution on the necessity of organizational changes in the Academy of Sciences (ibid.). Before long, however, the issue of fundamental versus practical research was raised at the Presidium once again by the Kurchatov commission on the "problems of nuclear physics."

2. The Kurchatov Commission

One week after the controversy over Kapitza's letter, and apparently independent of it, the Presidium met to discuss the report of the Academy's commission headed by I. V. Kurchatov. The commission was created in early 1954 to evaluate plans of

[3] On the general characteristics of the first years of Khrushchev's rule, see Agursky 1978; Gaddis 1997; Löwenhardt 1981; Löwenhardt, Ozinga, and van Ree 1992; Partos 1993; Smith 1998; Vadney 1992; Young 1994; Zubok and Pleshakov 1994; and Pyzhikov 1999.

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academic research in nuclear physics (Presidium 1954d). The majority of its members – Kurchatov, A. I. Alikhanov, L. A. Artsimovich, D. V. Skobel'tsyn, and I. E. Tamm – were nuclear physicists who, besides membership in the Academy, also had the experience of working within the Soviet atomic project. After a decade of most intensive work, the project had practically achieved both its major goals – the design of atomic and hydrogen bombs. Many an academic physicist who had contributed to the success now considered their most important patriotic duty fulfilled, and were getting ready to return to civilian life and fundamental research topics, leaving the weapons' further improvements to engineers and applied specialists. They spoke to the Academy's Presidium in a more independent and authoritative voice that reflected their newly acquired high moral prestige and assertiveness of politically important scientists. The recommendations of the Kurchatov commission thus carried more weight with the Academy's leadership than the opinions of Kapitza, the still not completely rehabilitated academician (Nesmeyanov 1999, 146).

Alikhanov, a member of the commission, presented its report to the Presidium during the meeting on 11 June 1954. His two main theses, stated on the very first page of the report, resembled very closely those of Kapitza's letter to the Central Committee. Alikhanov claimed that Soviet research in nuclear physics was lagging behind American research, and that primary importance and attention had to be given to abstract and "disengaged" (*otvlechennyye*) problems in nuclear physics (Alikhanov 1954, 53). "Disengaged" here meant research without direct practical and military applications, which, in Alikhanov's opinion, did not deprive it of uttermost importance:

> The primary political significance achieved by physics during the last years can be explained, first of all, by a sharp curtailing of the time lag between "disengaged" scientific discoveries in physics and their practical applications. . . . The country that maintains the leading position in advanced theoretical physics has therefore very good chances to acquire substantial advantages in the field of new technologies. . . . Today most disengaged questions in physical sciences can suddenly obtain genuine practical significance. (Ibid., 59)

While working on the atomic project, nuclear physicists got used to the previously unimaginable levels of resources and acquired administrative experience with industrial-size projects. Returning back to academic life, they started demanding a similarly high level of support for the civilian part of their research, too. Besides increased resources and supplies for the Academy's physical institutes, their list also included proposals to publish more openly the results of general and theoretical investigations in nuclear physics, to encourage free discussion and to make easier the exchange of information and contacts with colleagues from abroad.

Unlike their American colleagues in a similar situation, Soviet physicists did not refer to their research as "pure science." The phrase had such a strong negative meaning in the Soviet ideological discourse – at least since the late 1920s – that

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arguing in its favor would have been outright scandalous. Physicists avoided direct confrontation with ideology by experimenting with more flexible phrases: "abstract problems," "advanced fields of science," "basic principal problems," "new hypotheses of fundamental character." They claimed that these directions of research had been relatively neglected in the USSR, in comparison to the "development and mastery of new technologies, which had been implemented quite successfully." As a possible way of correcting the imbalance, they even suggested during the discussion at the Presidium the transfer of some installations and equipment from the Ministry of Medium Machine Building (the official name for the atomic project) to the Academy of Sciences (Presidium 1954c).

The commission's recommendation caught Nesmeyanov off-guard. He opened the discussion of Alikhanov's report with the tone of mild reproach: "We [the Presidum] have been quite complacent, thinking that physicists were graced with powerful patrons . . . . It turns out, however, that some fields of physics have not been patronized well enough. I ask you to keep in mind, that the Academy's Presidium still exists and still has at its disposal some means, however modest" (Presidium 1954c). One month later, on 9 July 1954, the Presidium acknowledged in a secret resolution that "research in a number of general fields of nuclear physics in the Soviet Union has lagged considerably behind analogous research in foreign countries," and called for "drastic measures in order to liquidate the critical situation that has developed in theoretical research" (Presidium 1954e). The resolution proposed building several new nuclear laboratories in the Academy of Sciences, doubling the volume of major physical journals, increasing the number of graduate and post-graduate students in theoretical and nuclear physics, and establishing a new administrative body for the coordination of research on the problems of nuclear physics without "special technological applications."

The Academy satisfied almost all demands of the Kurchatov commission. The physicists secured a resolution that provided them privileged financial support and relative freedom in defining the direction of their research within the Academy institutes. The decision, however, introduced further tensions into the work of the Academy, since scientists from other disciplines were looking at physicists as exceptionally privileged and arrogant. Nesmeyanov found himself in a difficult situation, as he was trying to find compromises and acceptable balances between different divisions and groups in the Academy.[4]

3. International Opening

The same meeting of the Presidium on 11 June 1954 discussed one more issue: the "results of the session of the Division of Physico-Mathematical Sciences." The Division had met on 20–23 May to celebrate the official opening of the fully

[4] On Nesmeyanov as president of the Academy, see Solov'ëv 1999.

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reconstructed Main Astronomical Observatory in Pulkovo. The legendary observatory, completely destroyed during the Nazi siege of Leningrad, had been rebuilt from scratch (Gurshtein and Ivanov 1995). The opening ceremony was an important event in another respect, too: it became the first Soviet scientific meeting after 1947 with official participation of scientists from capitalist countries. For almost eight years, Soviet scientists had worked without direct contact with western colleagues. Though not banned officially, such contact had been effectively nullified by the Cold War, complicated bureaucratic regulations, and the exaggerated fear of spies. The situation in astronomy was slightly better than in other disciplines, since the International Astronomical Union remained one of the only two international scientific organizations in which the USSR continued to participate throughout the most strenuous years of the Cold War. It was thus convenient to start the revival of international contact with an astronomical conference.[5]

On the issue of an international opening, all members of the Presidium were united and used the occasion to adopt a strong resolution in favor of broader relations with foreign scientists. The autarchy of late Stalin years was obviously abhorrent to them, nor was it justified or reinforced by any high ideological principle. Even the Chief Academic Secretary A. V. Topchiyev, on most occasions a faceless Stalinist bureaucrat par excellence, urged his colleagues to work out a detailed program for the development of international contact and submit the proposal to political authorities (Presidium 1954c). Topchiyev had connections in the Communist party apparatus and might have guessed that the Central Committee would welcome such an initiative.

Indeed, the new Soviet leaders desired a change in international relations perhaps even more acutely than scientists. Extremely insecure after Stalin's death and frightened in the face of Western military threat, they desperately wanted to do something to decrease Cold War tensions. The necessity to proclaim ritualistic loyalty to the "course of Lenin and Stalin" and the power struggle in the Politburo, however, complicated the process of working out an acceptable solution and made proposals of ideological and political novelties a risky business (Zubok and Pleshakov 1994). Thus when Prime Minister G. M. Malenkov first suggested in 1954 to reconsider the main foreign policy assumptions on the basis of an expert conclusion that nuclear war would result in a global disaster and could not be won by either side, he suffered a political setback and accusations of "defeatism" from N. S. Khrushchev and other Politburo members.[6] Malenkov's proposal contradicted the obligatory historical optimism of Soviet ideology as well as Lenin's thesis that imperialism inevitably leads to war. Only in 1956, after Khrushchev had sufficiently secured power, did he introduce a similar ideological change openly and without fearing any opposition. At

[5] For a review of this meeting in the American media, see "Iron Curtain Breaks" 1954.

[6] According to Jeffrey Roberg, the expert report on "The Dangers of Atomic War and President Eisenhower's Proposal" was prepared by the atomic minister Malyshev and scientists Kurchatov, Alikhanov, Kikoin, and Vinogradov (Roberg 1998, 60–61).

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the Twentieth Party Congress, Khrushchev proclaimed that the new global balance of power made it possible to avoid world war altogether, thus making "peaceful coexistence" the official Soviet policy (Molotov, Malenkov, and Kaganovich [1957] 1998).

The proposal to open Soviet science for international contact was much easier to introduce: it was perfectly fine from the point of view of Marxist ideology and only corrected the excessive practices of late Stalinism. Already in 1954 the official discourse in the Academy shifted from the rhetoric of ideological differences between Soviet and bourgeois sciences to stressing the need of communication and international cooperation in science. The interests of the academic community overlapped with the interests of Soviet leadership, who were eager to explore the possibilities of "science diplomacy" as a means to open up dialogue with the West, lessen Soviet international isolation, and decrease tensions. The official reports of the Academy of Sciences started mentioning as important accomplishments the annual increases in international contact of Soviet scientists. The Soviet membership in international scientific organization, for example, rose from 2 to 108 in ten years, as shown in the following table:

Year	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
Number	2	6	18	42	61	72	82	89	90	95	100	108

In 1956, with the principle of peaceful coexistence now official policy, the Soviet government sent its most secret scientist, the director of the Soviet nuclear project I. V. Kurchatov, to the international conference in Harwell, England. Kurchatov was authorized to openly discuss the status of the then strictly classified Soviet research on controlled thermonuclear fission and to make western scientists an offer of international cooperation in the field. The Soviet offer was accepted the following year, when American and British scientists gave reports about some of their own research in the field at the international conference in Geneva. The research on peaceful thermonuclear fission quickly turned into a genuinely declassified and international field (Golovin 1967, 88–89). Some other Soviet scientists, too, started receiving opportunities for occasional travel to conferences abroad, although this remained a heavily restricted and bureaucratically regulated procedure.

In the early 1960s the Soviet Union dramatically increased the activities of the publishing house *Mir* for the translation of foreign scientific books and established the Institute of Scientific-Technological Information (INION) with the task of reviewing and abstracting world scientific literature. The Academy started to view international relations as one of its most important activities and specified as one of the main goals of its institutes and employees "the thorough study of the successes of foreign researchers in various fields of science and the implementation of this experience in the research institutions of the Academy of Sciences of the USSR" (Presidium 1956a). In the words of the next President of the Academy M.V. Keldysh,

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international cooperation in science was "strengthen[ing] our influence in international scientific organizations" and promoting "the propaganda of Soviet scientific achievements and successes in building of the Communism" (Keldysh 1965, 1). Thus came the shift from autarchy to restricted internationalism in Soviet science.

4. The Problem of Introducing New Technologies

One year after nuclear physicists had largely achieved their demands for changes in the existing relationship between fundamental and applied research, the academic lobby requested that the political leadership make similar changes for the entire Soviet science. Two secret memoranda were sent to the Central Committee in 1955, entitled "The Most Important Tasks for Scientific Development in the Sixth Five-Year Period" and "The Organization of Research in the USSR and in the main Capitalist Countries." The documents were signed by the President of the Academy Nesmeyanov, the Head of the State Committee for New Technologies V. A. Malyshev, and the Minister of Higher Education V. P. Elyutin.[7] After enumerating important achievements of Soviet science in their first memorandum, the authors complained that due to special circumstances, such as "fast industrialization," the need to "catch up with foreign countries," and the "lack of foreign support," too much research effort had been devoted to the "accommodation of foreign scientific achievements for the needs of our industry": "Today, when parity has been achieved in some fields of technology, Soviet scientists should rely more upon their own scientific accomplishments. Such a situation has already developed in the field of atomic energy, nuclear physics and a few other fields" (Nesmeyanov, Malyshev and Elyutin 1955a, 7).

Like many documents of the post-World War II decades, the memorandum drew heavily upon military metaphors to get its message across: "With regard to the kind of attack on nature, the general scientific front consists of two categories. The first one is the organized and planned offensive, whereby columns aim at the solution of an economically important specific task. The other one is a general advance and reconnaissance that prepare ground for the future directed offensive" (ibid., 62). As relative importance was shifting toward the research of the second kind, the authors recommended that the sixth five-year plan should "sharply increase the proportion of scientific work devoted to the search of new natural phenomena, the development of the new scientific methodology, and the investigation of new connections between phenomena" (ibid., 8).

The second memorandum dealt directly with the problem of "introducing new technologies into mass production," which Soviet officials regarded as the main and

[7] The cover letter stated that the two memoranda were prepared upon a request by N. A. Bulganin, a member of the Central Committee's Presidium who was apparently in charge of overseeing the activities of the Academy of Sciences.

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almost permanent bottleneck en route to technological modernization. The first post-war decade was a rather successful one in this regard, yet Nesmeyanov and his co-authors complained nevertheless about many cases from recent and earlier periods, in which the discoveries and inventions of Russian and Soviet scientists had found quicker applications abroad, rather than in the native industry and economy. Arguing that the USSR lagged behind the West primarily in the crucial stage of the "introduction of new technologies," the memorandum proclaimed the situation, rather illogically, "a consequence of the circumstance that a *relationship* with industry is substituted in our country by *subordination* to industry" [italics added]. They further complained that in the USSR "the researcher has no opportunity to tear himself away from the demands of the day and to freely anticipate the future. . . . Science should not trail industry" (Nesmeyanov, Malyshev and Elyutin 1955b, 85).

As examples of such "trailing," Nesmeyanov mentioned the work of some of the Academy's institutes in the Division of Engineering Sciences. In February 1956, at the General Meeting of the Academy, he criticized what he perceived as those institutes' tendency to solve minor technological problems while forgetting the fundamental issues of national importance. Two weeks later, addressing the Twentieth Congress of the Communist Party, Nesmeyanov again mentioned several concrete examples of "superfluous, trivial activities" such as the development of automatic doors for Moscow's restaurant *Praga* and the development of a new type of durable steel for pens. Nesmeyanov argued that the activities of the Academy of Sciences "should not be marked by results of limited, applied significance. The Academy's basic task should consist in discovering and studying new phenomena of nature and society, in establishing and generalizing the laws of relationship among phenomena and putting these laws to work in the interests of socialist society and its production" (Löwenhardt 1981, 136).

Contrasting the two kinds of research quickly became a standard rhetorical trope, usually accompanied by the demand that "the chief scientific workers of 'big science' should have an opportunity to devote a considerable part of their energy and intellect to discovering still unknown events and their interconnections" (Nesmeyanov, Malyshev and Elyutin 1955b, 64). Claiming that science had to direct industry and technology, rather than the reverse, the 1955 memorandum used the newly found substitute "fundamental science" in place of the still derogatory term "pure science" and put forward a first draft of the future broad institutional and administrative reform:

> The USSR Academy of Sciences should be responsible for coordinating the work on fundamental scientific problems. . . . The work of applying new scientific inventions to industry should be concentrated in industrial scientific-technological institutes, specialized departments of the institutes of higher learning, and large industrial laboratories. . . . The coordination of work relevant to technological development . . . should be concentrated in the State Committee for New Technologies. (Ibid., 139–140)

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While the rhetoric spoke of fundamental science "leading" industry rather than "being subordinated" to it, the administrative solution proposed a simple institutional separation between the two, by transferring the task of technological modernization from the Academy to a separate government agency, the State Committee on new technologies.

5. Revenge on the Philosophical Front

The Twentieth Congress of the Communist Party of 1956 brought about a great fermentation of minds in the country. Khrushchev's secret report to the delegates and the closed letter of the Central Committee that subsequently circulated among party cells both criticized Stalin's "personality cult." The rest of the population sensed the documents' content through leaks and rumors and derived a practical lesson. Almost overnight, many thoughts and themes that had been banned for years from public discourse exploded into open discussion. The issue of a looming reform in science, too, could no longer be confined to confidential bureaucratic deliberations, but turned into a matter of lively and open controversy. At his long talk at the party Congress, Khrushchev only mentioned some unspecified need for "an improvement" in Soviet science (Khrushchev 1956). What exactly had to be improved was discussed by the academic public during a series of meetings called *aktivy*.[8]

Aktivy were organized by the Academy Presidium in close cooperation with the Scientific Department of the Central Committee. Voluminous correspondence between the two offices discussed the meetings' agenda, places and dates, the number and composition of participants (Central Committee 1956). The goal was to represent all major disciplines and geographical divisions of Soviet science. The meetings took place in Leningrad on 16–17 April, in Novosibirsk on 24–25 April, and in Moscow on 7–8 May 1956. Both academic bonzes and rank-and-file participated. The Leningrad *aktiv*, for example, included 84 members of the Academy along with 375 employees of the Academy's institutes, 52 employees of the local branches, 62 representatives from industrial enterprises, non-academic research institutes and universities, and 72 representatives of the Party organizations and the trade unions (Presidium 1956b, 146).

On behalf of the Academy leadership, Nesmeyanov and Topchiyev read the official opening address "The Twentieth Party Congress and the tasks of the USSR Academy of Sciences," and then opened the podium to debate. Painstaking preparations notwithstanding, the discussion and emotions often ran out of control. One of the most sensitive problems that officials were reluctant to raise was the domination of

[8] According to the 1939 Party Statute, *aktiv* is a meeting in which participants engage in an active and business-like discussion of some important decision of the Party and the government, rather than merely approving or demonstrating their support. It usually involved both political and professional activists, including leading experts on related questions.

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Lysenko and his school over Soviet genetics. The corresponding member of the Academy D. N. Nasonov opened a public attack on Lysenko during the Leningrad *aktiv*, claiming that Soviet cytology lagged behind due to "the mounting of forcibly created authorities, the icons who put their own words and opinions in place of experiment and observation, which are the true criteria of scientific research for every scientist and materialist. . . . Such was the role of Lysenko and Lepeshinskaya in our country. Lysenko's prestige was created by methods of intimidation employed by Lysenko himself and his subordinates. As a result, the entire branch of biology fell into decay." Another discussant, professor Tikhomirov, added further that the August 1948 Session in agricultural sciences had established an "Arakcheyev [police] regime in biology" (Kozlov 1956).

Biologists were supported by nuclear physicists, such as L. A. Artsimovich, who demanded a general meeting of the Academy of Sciences devoted specifically to "the liquidation of harm inflicted on biology during the era of the 'personality cult'." Artsimovich wanted to avoid any future situations when "pinning labels substituted for firmly established scientific facts, when pragmatic considerations replaced the original philosophy of dialectical materialism, when scientists' conscience was silenced, and instead of advanced science, grandma's fairy tales were taught at colleges and schools" (Artsimovich 1956, 237). Scientists, especially physicists, opposed the use of ideological criteria in science, yet it was still too early to raise such objections plainly. Instead, they argued that Marxist philosophers lacked scientific knowledge and often incorrectly interpreted the achievements of modern science. Most outspoken was, again, Artsimovich:

> Since long ago, our philosophers have stocked in their props philosophical suits for each branch of science, all sewn to equal measure out of one and the same set of quotations. If the suit doesn't fit one or another branch of science, they are tempted to adjust this branch surgically, to ensure that it fits the pre-made philosophical garment. . . . One needs to understand that a novel scientific content broadens philosophy itself and, consequently, changes it. . . . One cannot do anything in modern science by merely combining existing quotations. A philosophical activity of this kind will be useless with regard to the philosophy of science. (Ibid., 238–239)

The economist K.V. Ostrovityanov protested, suspecting that Artsimovich was attempting to revise the very foundations of dialectical materialism, but Nesmeyanov tried to smooth the conflict over: "As I understand the proposal, science should not change philosophy, but enrich it" (Nesmeyanov 1956, 249). The Presidium, however, was not willing to revisit the politically sanctioned ban on genetics established after the 1948 August Session. Topchiyev categorically stated that the 1948 Session had dealt with the "question of the struggle between materialism and idealism, and ensured the victory of Marxist-Leninist methodology in biological sciences. . . . One cannot reduce the great significance of the Session to the work of individual scientists.

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We have no reason to doubt the scientific achievements of T. D. Lysenko" (Presidium 1956b, 151).

Artsimovich's risky language drew accusations of "anti-Soviet argumentation" and letters of denunciation, such as the one sent to the party's Central Committee by its volunteer employee (*instruktor*) A. S. Monin (Ilizarov 1998, 346). The accusations failed, however, to damage the career and political clout of the nuclear physicist, who by the end of 1956 was promoted to full membership in the Academy and quickly rose to responsible administrative positions in the academic establishment. Nesmeyanov's position typically consisted of maintaining the appearance of civility, avoiding an open conflict between "scientific" and "ideological" workers. Perhaps he was aware that a similar conflict between commissars and professional officers had already cost the war hero marshal G. K. Zhukov his post as the Soviet Minister of Defense (Pyzhikov 1999, 150–157). The desired compromise was worked out in October 1958 at the All-Union conference on philosophical problems of science.

In earlier Stalin times such conferences often had on their agenda "the struggle against idealism and metaphysics in science" and involved heavy ideological fighting. Militant slogans were still ritualistically present at the 1958 conference, too, but its main message, explained in Nesmeyanov's opening address, was reconciliation, or "strengthening the creative unity between philosophers and scientists" (Nesmeyanov 1958, 7). Ostrovityanov, on behalf of the organizing committee, also struck a reconciliatory tone, defining the meeting's goal as "to conduct the discussion in an atmosphere of complete cooperation, rallying the large army of Soviet scholars into a united friendly collective" (Ostrovityanov 1958, 9–10). Several leading physicists, such as Artsimovich, Ioffe, Kapitza, Landau, and Tamm, refused to grace the meeting with their presence: their post-bomb authority already allowed them to scornfully ignore Marxist philosophers (Kirilin 1958). Among the important physicists who were present, at least two – V. A. Fock (Fok) and D. I. Blokhintsev – had earlier developed a serious interest in Marxist philosophy and Marxist interpretations of relativity and quantum mechanics (Graham 1993, 112–117).

The conference proceedings reiterated as before that the application of philosophy to the sciences' demands that scientists study dialectical materialism, but they also included an important novel requirement, "the deep study of modern science by philosophers" (O zadachakh 1958, 604). What on the rhetorical level was represented by this symmetrical formula, in actual practice became a role reversal: ever since, the typical work of Marxist philosophers of science turned into demonstrating the harmony between science and dialectical materialism by learning from and commenting upon rather than criticizing the achievements of modern science. Accusations of philosophical idealism which had been previously raised against such theories as relativistic cosmology or cybernetics disappeared from public discourse. Even the ban on "formal genetics," the most official of all party decisions on science, could no longer be strictly reinforced, even though Lysenko continued to enjoy political and administrative favors. Additional efforts by scientists and further political

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changes would be required before the party quietly acknowledged the mistake in 1964 and withdrew its support from Lysenko and his "Michurinist biology."

6. Scientists versus Engineers

The controversy over philosophy was not the only one that broke out during the stormy discussion at the *aktivy*. Nesmeyanov's idea on the "division of labor" between fundamental and applied research met with some opposition, primarily from the Academy's Division of Engineering Sciences. The Director of the Institute of Machine Science, general A. A. Blagonravov, reminded Nesmeyanov that the Twentieth Party Congress had not only called upon scientists to "broaden theoretical research in all fields of knowledge," but also reiterated the party's constant demand for the Academy of Sciences to work for "the concrete needs of the national economy" and to contribute to the country's technological progress. Indeed, the congress proceedings mentioned the need to "concentrate the efforts by scientists and the material resources of the research establishment on the major scientific problems of great economic importance" (Löwenhardt 1981, 141).

Blagonravov's opinion carried weight. He had earned a high reputation from his former service as the Rector of the Artillery Academy and through his and his institute's important contributions to the development of ballistic missiles. Others who sided with him were: the radar pioneer, the director of the Electrophysics Laboratory of the Institute of Metallurgy P. Oshchepkov, the head of the laboratory at the institute of Mineral Fuels L. Sapozhnikov, and the director of the Institute of Complex Transportation Problems T. Khachaturov. On the opposite side of the debate were physicists Tamm and Artsimovich, who ardently demanded that the Academy spare no effort in developing fundamental research, by which they meant primarily research on nuclear and elementary particle physics and the application of physical and chemical methods in biology.[9] Kapitza somewhat jokingly entertained a hope that, as the industry ripened, it would overtake relevant institutions for practical research, whereby the Academy would gradually lose many fields, but no longer be held responsible and criticized for the slow industrial introduction of new technologies. On a more serious note, he proposed to find out what kinds of research could be done within the industry, and to transfer corresponding research units from the Academy to the appropriate ministries (Kapitsa [Kapitza] [1956] 1987, 166).

Nesmeyanov, once again, tried to work out a compromise solution and reconcile the adherents of the "fundamentalization" of the Academy with the Division of

[9] In Tamm's words, "the most important branches of contemporary science are, probably, physics, nuclear physics, on the one hand, and biology on the other" (Tamm 1956, 241). Artsimovich pointed out that "during the last decades, the theory of relativity and quantum mechanics were developed in physics. These disciplines crucially changed the very basic ideas of the general worldview. In biology, the development of the chromosome theory of heredity was probably one of the most significant achievements of the twentieth century" (Artsimovich 1956, 238).

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Engineering Sciences. At his talk at the General Academy Meeting in October 1956 he avoided using both polemical labels, "fundamental" and "technical," while playing with more elaborate metaphors such as "the great practical usefulness of an abstraction" (Nesmeyanov 1956, 180–181). Members of the Division of Engineering Sciences might have been satisfied with redefining "fundamental" as simply "the most advanced science," but physicists were less willing to compromise. Artsimovich complained about Nesmeyanov's "characteristic softness," while Tamm criticized him for the lack of "a definite, effective program to eliminate the defects." At the subsequent elections of the Academy's president in December 1956, Nesmeyanov recalled, "I was reelected by the large majority of votes, but not unanimously. As far as I remember, 17 academicians of 88 were against me. According to the common opinion those were mainly the physicists' votes" (Nesmeyanov 1999, 176).

During his second term, Nesmeyanov continued to draw a middle line between the diverging interests of physicists and engineers, trying to avoid open confrontation. He decentralized the decision-making process by transferring many responsibilities from the Presidium to the Academy's Divisions and further down to directors of individual institutes and laboratories. He also tried to make the planning of research and the organization of material supply more flexible. He sensed, however, that he was gradually losing rapport with the Communist party leader N. S. Khrushchev.

7. The Reform

Nesmeyanov did not know the exact source of Khrushchev's dissatisfaction, but simply felt that "unpleasant situations arose more and more often. Sometimes it was an apparently rather accidental remark, but sometimes a remark suggesting restructuring of the Academy" (ibid., 263). It is not clear who among the academic elite might have influenced Khrushchev's views, but subsequent events revealed the names of the two most active promoters of academic reform: the applied mathematician M. V. Keldysh, who was coordinating the Soviet space program, and the chemical physicist N. N. Semënov, who had recently become the first Soviet scientists to receive a Nobel Prize. The opposing camp had its leader in I. P. Bardin, the chief designer of the Soviet metallurgical industry and member of the Academy's Presidium from the Division of Engineering Sciences.

Nesmeyanov recalled that he discussed Khrushchev's remarks about restructuring with other Presidium members, but could not come up with anything particularly novel:

> Only M. V. Keldysh was convinced of the desirability of changes, which he implemented later when he became the President of the Academy of Sciences: [these changes were] increasing the number of divisions, each of which was responsible for a large important problem; and the liquidation of the Engineering Sciences Division. To the majority of

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> us these suggestions seemed unacceptable for a number of reasons. The liquidation of the Engineering Sciences Division, in particular, could have provoked an outburst for obvious reasons. (Ibid., 264)

The crucial encounter seems to have occurred in June 1959 at the Central Committee Plenum on technological progress in industry and construction. The Academy was represented at the Plenum by Nesmeyanov, Topchiyev, and Semënov. The former two mainly enumerated in their speeches relevant recent accomplishments of the Academy, while Semënov chose to emphasize the need to strengthen fundamental research, without explicitly mentioning or criticizing, however, the Division of Engineering Sciences. In his concluding speech on the last day of the Plenum, Khrushchev suddenly burst out with a more thoroughgoing proposal:

> I think that a difficult situation has arisen in some scientific institutions of the Academy. Some scientists may disagree with me, but I consider it unwise for the Academy of Sciences to take on questions on metallurgy and coal mining. After all, these areas were not within the Academy's domain before. Take, for example, comrade Bardin, a splendid engineer and eminent scientist. He built the Kuznetsk metallurgic combine and was subsequently elected to the Academy. Understandably, he requested an institute to be built for him in Moscow. A similar thing happened to academician Shevyakov, a prominent specialist on coal. . . . What's happening, comrades, is it worse for science to develop in Sverdlovsk, Stalino, or Dnepropetrovsk, rather than in Moscow? Science must be where life is. . . . Let's set up laboratories at plants and factories, establish scientific institutes and other scientific centers under the regional economic councils (*sovnarkhozy*), and assign more young people to them, along with experienced and well-known scientists. . . . We shall ask the USSR Academy of Sciences, its Presidium, to draft proposals for further improving the activity of the Academy, its Divisions, branches, and institutes. (Khrushchev 1959)

On 6 July the Academy Presidium sent Khrushchev an official letter, expressing its complete readiness to undertake such a reform and, in particular, to reorganize the Division of Engineering Sciences into the Division of Automatics, Tele-Mechanics, and Radio-Electronics, and to transfer several institutes and laboratories to industrial ministries (Nesmeyanov and Topchiyev 1959). The Academy was ready to get rid of the Mining Institute, the Institute of Transport, the Institute of Electrical Engineering, the Metallurgical Institute, and the Institute of Machine Sciences, among others. The opposition of concerned engineers, however, did not wind out immediately, but resulted in several months of heated public debate.

The opening salvo came from Semënov, who on 9 August published an article in the newspaper *Izvestiya*, supporting the envisioned reform (Semënov 1959). The article was essentially an extended version of Semënov's speech at the June Plenum, but with much more radical conclusions, including the closing of the Division of

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Engineering Sciences and the transfer of applied institutes to the industry.[10] A reply by Bardin was published in the same newspaper on 28 August. It was entitled "A Bridge between Theory and Praxis" and argued that the Division's institutes served as the necessary link connecting advances in major sciences with their applications in concrete fields. A further, more explicit critique directed at Semënov was published a few days later in an article signed by several academicians in engineering sciences, who argued that it was impossible to fully divide research into the fundamental and applied categories, and that "instead of dividing, it is necessary to unify various aspects of science" (Blagonravov, et al. 1959). Altogether, *Izvestiya* and other newspapers published about a dozen, mostly critical, replies to Semënov's proposal.

The first letter supporting Semënov appeared on 21 October 1959. It was signed by two physicists – Alikhanov and Tamm – and two chemists – M. I. Kabachnik and M. M. Shemyakin, and was written in a tone that implied that administrative reform was already a foregone conclusion. The problem that remained to be solved, according to the authors, was to decide which particular institutes of engineering profile should remain in the Academy and which should belong to various branches of industry. At earlier stages of the development of the Soviet power, the letter argued, even some simple technical problems required the assistance from the Academy of Sciences. As individual branches of industry mature, however, they should regain responsibility for the appropriate research institutes.

It took almost one extra year until the Council of Ministers entrusted a special commission to review the existing pool of institutes and the preparedness of industrial ministries to take control of them. The commission included A. N. Kosygin, the Chairman of the Council of Ministers, and Nesmeyanov, the President of the Academy of Sciences. As Nesmeyanov recalled, the decision was taken separately for each individual institute and ministry, so that the future constitution and profile of the Academy emerged only gradually (Nesmeyanov 1999, 265). Finally, on 3 April 1961, the Central Committee and the Council of Ministers adopted a joint decree "On measures for better coordination of scientific research in the country and the work of the Academy of Sciences," which opened with a premise that the transfer of some institutes, laboratories, and branches should fulfill the double goal of "concentrating the work of the USSR Academy of Sciences on the most important problems in natural sciences and humanities, while at the same time improving the work of branching institutes" (Central Committee 1961). Altogether, the Academy lost seven regional centers and 50 research institutes, mostly of the engineering profile, which employed over twenty thousand workers. The decree was published on 12 April 1961, which coincided with the greatest triumph of Soviet science and engineering, the first manned space flight by Yuri Gagarin. In June of that year Keldysh was elected the

[10] An article with such a far-reaching proposal was most probably published with approval or encouragement from the Central Committee. However, archival materials documenting the process of discussion and decision making in this case have not yet been found.

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new president of the Soviet Academy and saw to it that the administrative reform he had championed proceeded to completion.

Conclusion

Between 1953 and 1961 both the image and the actual practice of Soviet science underwent dramatic changes. What used to be depicted as rigid Stalinist enterprise, began to be viewed more like a growing organism: some features which were formerly deemed essential, later becoming unneeded and even burdensome. The first such feature to be quietly dropped from the policy-making practices and eventually even from the ideological banners was the principle of "partymindedness" (partiynost') of science. Already the 1955 memoranda by Nesmeyanov omitted references to the Communist party as "the force that stimulates the progress of science and its development." Instead, the document assigned the role of the primary mover to the "public opinion of specialists," which "objectively reflects the needs of the developing socialist industry, the defense and the culture of the country" (Nesmeyanov, Malyshev and Elyutin 1955a, 9–10). The shift in ideological phraseology reflected corresponding changes in the increased autonomy of the Soviet Academy of Sciences and its General Assembly, some decentralization in the Academy's management, and the establishment of new, de-facto more independent, centers of research, such as the one in Siberia.

The principle of "planning" also suffered serious setbacks during the reform decade, even though it remained formally in force. Nesmeyanov secured permission to forego planning the research on fundamental science, arguing that "it is hardly possible to explicitly define the expected results and terms" of such research (Nesmeyanov, Malyshev and Elyutin 1955b, 8). Submitting plans for research continued as a regular ritual even in the most abstract fields of science, yet the practice of approving and enforcing such plans became increasingly pro-forma, except when it dealt with requests for considerable increase in resources and equipment. In the latter case, some important progress also appeared to have been achieved at least for the duration of the 1950s and early 1960s, when the total expenditures and manpower of science rose exponentially, while bureaucratic procedures and formalities were considerably simplified in comparison with the Stalin period.

The term "peopleness" (*narodnost'*) of science does not appear in Nesmeyanov's texts. Instead, Nesmeyanov used the notion "collectivism (*kollektivnost'*) of scientific creative work," meaning by this the participation and collaboration of big collectives of specialists in scientific projects of national importance. According to this view, the success of the research enterprise depended not on scientists alone, but also on engineers, technicians, workers, and administrators. Having become a mass profession, science was no longer suspected of becoming elitist and separated from the life and concerns of ordinary people. The changed scale and nature of scientific establishment in the second half of the twentieth century was further reflected in the

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new ideological term "Scientific-Technological Revolution" that gained currency during the 1970s and declared science to be a part of the economic "basis" – rather than ideological "superstructure" – of contemporary society.[11]

Perhaps the most important change, in terms of its consequences, however, was the revision of the cornerstone principle of Soviet science: the connection between science and practice. Since the mid–1950s, Soviet scientists embraced the notion of "fundamental science," or research on fundamental questions with no requirement of direct practical applications. The term functionally substituted for the notion of "pure science," but without the latter's negative connotations. On the contrary, the notion of "fundamental science" acquired an unquestionably positive meaning and gained high ideological status in the value system of academic community for the rest of the Soviet period. It even survived, in large degree, the demise of the Soviet Union.

Somewhat ironically, the Soviet scientists' acceptance of an important ideological resource of their western peers was soon reciprocated on the other side of the Iron Curtain by a similarly dramatic ideological reversal. Since the 1960s, the notion of "pure science" has been quickly losing popularity in the West, being replaced instead by another concept that viewed science as deeply immersed and responsive to the society's needs and values. This change of dominant perception happened without an explicit admission that the "new" approach was formerly known to represent a quintessentially Marxist view. Both ideological near-reversals occurred relatively quietly, and both had serious implications for the practice of science. The consequences of those changes for the fate of late Soviet science – and for the fate of Soviet Union herself – still await their historians.

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[11] See Hoffman 1978 for a very good analysis of the early interpretations of the theory of "Scientific-Technological Revolution."

[12] The abbreviations: ARAN: Archive of the Russian Academy of Sciences, Moscow; RGANI: Russian State Archive of Modern History (former TsKhSD).

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