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0521287898 - Science in Russia and the Soviet Union: A Short History

Loren R. Graham

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By the 1980s the Soviet science establishment had become the largest in the world, but very little of its history was known in the West. What has been needed for many years in order to fill that gap in our knowledge is a history of Russian and Soviet science written for the educated person who would like to read one book on the subject. This book has been written for that reader.

The main theme of the book is the shaping of scientific theories and institutions in Russia and the Soviet Union by social, economic, and political factors. Major sections include the tsarist period, the impact of the Russian Revolution, the relationship between science and Soviet society, and the strengths and weaknesses of individual scientific disciplines. The book also includes discussions of changes brought to science in Russia and other republics by the collapse of communism in the late 1980s and early 1990s.

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Preface

I HAVE written this book with a certain type of reader in mind: an educated person who knows little about the history of Russian and Soviet science and technology but would like to read one book on the subject. The book is not, therefore, aimed primarily at Russian area specialists or at that very small circle of scholars who specialize in Russian and Soviet science and technology. Many of the latter people are friends and colleagues of mine, and their names will often be found in the Bibliography and in the Notes. I have gained immensely from their insights. Much as I would like for them to think well of the book, I would be even more pleased if a nonspecialist would read it and feel that it had introduced him or her to the field.

Such an introduction is surely needed. By the 1980s there were more scientists and engineers in the Soviet Union than in any other country in the world, but the history and achievements of that scientific community are poorly known in the West. I have tried to present a short history of that community in a readable form. As I have written that history I have again and again been struck by its remarkable features.

The book is in four parts, the first three of which are in the text proper, and a fourth that appears as Appendix Chapter A: The physical and mathematical sciences, and Appendix Chapter B: The biological sciences, medicine, and technology. The two Appendix chapters are analyses of the strengths and weaknesses of Russian and Soviet science field by field. They are placed in the Appendix because the casual reader may not be interested in the amount of detail that they contain about specific fields of research and individual Russian and Soviet scientists. These chapters are not, however, mere lists or compilations of data but, instead, discursive historical interpretations of the core of Russian and Soviet science. They have been indexed along with the rest of the book so that the person seeking information about a specific field or a specific scientist will be able to find the appropriate section in the index.

I have dedicated this book to my students, both undergraduate and graduate, who at four different universities – Indiana, Columbia, MIT, and Harvard – have inspired me intellectually and sustained me person-

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ally. I would like to name a few of them here, but would inevitably leave out others equally deserving of citation. Some of my former students' names can be found in the Notes, because a few of them continued to work in the same field as I.

Throughout the text whenever I have given Russian language terms or names I have used the standard Library of Congress transliteration system, without diacritical marks, except in cases of words or names so well known in English according to different spellings that it is best to follow the current practice (Trotsky instead of Trotskii, *glasnost* instead of *glasnost'*). All translations are mine except when otherwise noted.

As in the case of all researchers, I am seriously in debt to generous institutions and individuals. Research on this book began at the Kennan Institute for Advanced Russian Studies at the Woodrow Wilson Center of the Smithsonian Institution. In intervening years I have relied on the services of the Program on Science, Technology, and Society at the Massachusetts Institute of Technology and the Russian Research Center and the Department of the History of Science at Harvard University. In 1991 I was pleased to receive support from the John D. and Catherine T. MacArthur Foundation for a series of joint U.S.–Russian seminars entitled “Science and Technology with a Human Face,” which has increased my knowledge of Russian and Soviet science. In the Soviet Union I have worked at the Institute of Philosophy and the Institute of the History of Science and Technology of the Soviet Academy of Sciences, as well as the archives of the Academy and the Central Governmental Archives of the October Revolution. Among libraries the three that have provided me the most support are the Widener Library at Harvard University (truly one of the glories of American education), the Library of Congress, and the Lenin Library in Moscow.

This book draws upon several decades of teaching and research, and it would be impossible to name all the individuals who at one time or another have helped me. Let me name only two, who stand out: my wife, Patricia Albjerg Graham, whose name appears only this one time but who might be footnoted on practically every page, and Kenneth Keniston, who, as the director of the STS Program at MIT, provided an ideal environment for working on a book of this type.

Loren Graham
Grand Island, Lake Superior
October 1992

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1. Presidium building, Russian Academy of Sciences. This eighteenth-century mansion was originally built by a wealthy factory owner and later was owned by Tsar Nicholas I. Since 1934 it has been the headquarters of the Academy. It is located on commodious grounds just off the busy Lenin Prospect near downtown Moscow. Photo courtesy of Institute of the History of Science and Technology, Moscow.

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2. M. V. Lomonosov (1711–1765), Russia's first significant scientist and founder of Moscow University (1755). Illustration courtesy of Institute of the History of Science and Technology, Moscow.

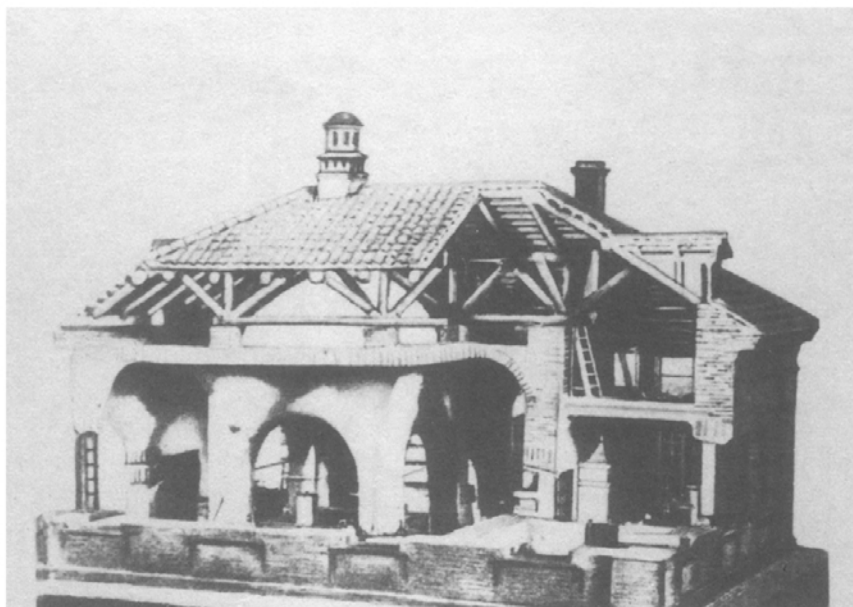
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3. A model of Lomonosov's chemical laboratory in St. Petersburg, the first chemical laboratory in Russia, opened in 1748. Illustration courtesy of Institute of the History of Science and Technology, Moscow.

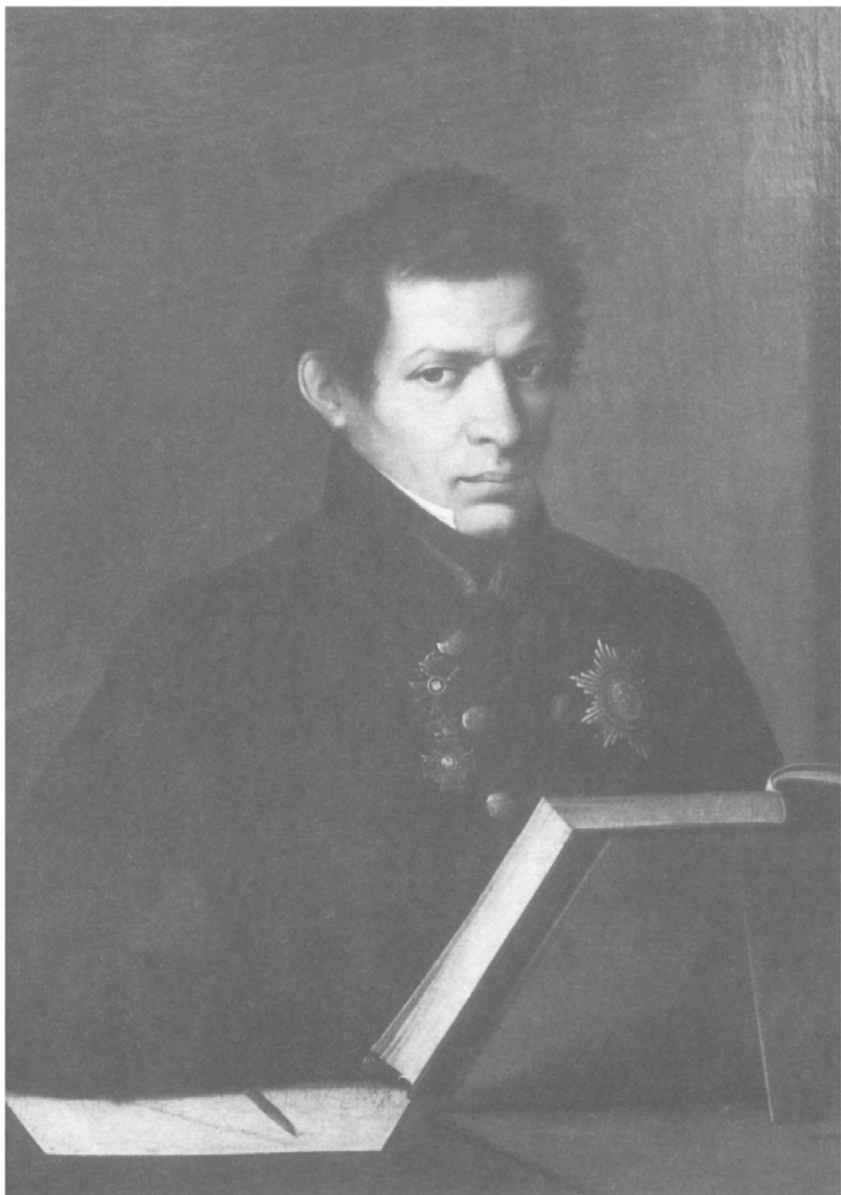
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4. N. I. Lobachevskii (1792–1856), the mathematician who first published a non-Euclidean geometry (1829–1830). Illustration courtesy of the Institute of the History of Science and Technology, Moscow.

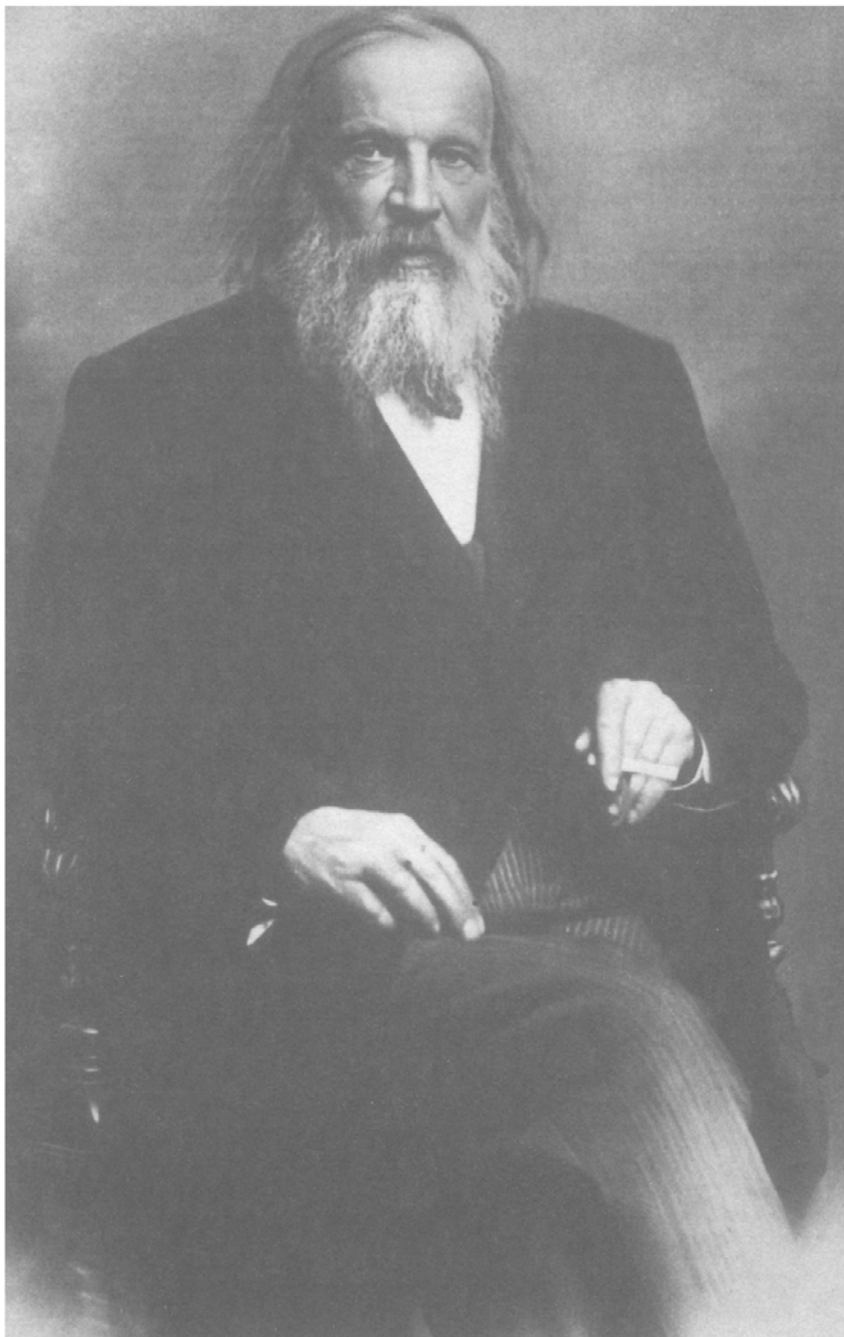
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5. D. I. Mendeleev (1834–1907), the father of the periodic table of chemical elements (1869). Photo courtesy of the Institute of the History of Science and Technology, Moscow.

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6. V. V. Dokuchaev (1849–1903), international leader in soil science.
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Moscow.*

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7. I. P. Pavlov (1849–1936), noted physiologist who developed the concept of conditioned reflexes and the first Russian to receive the Nobel Prize (1904). Photo courtesy of the Institute of the History of Science and Technology, Moscow.

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8. A. F. Ioffe (1880–1960), founder of the Leningrad Physico-Technical Institute, often called the “cradle of Soviet physics.” Photo courtesy of the Institute of the History of Science and Technology, Moscow.

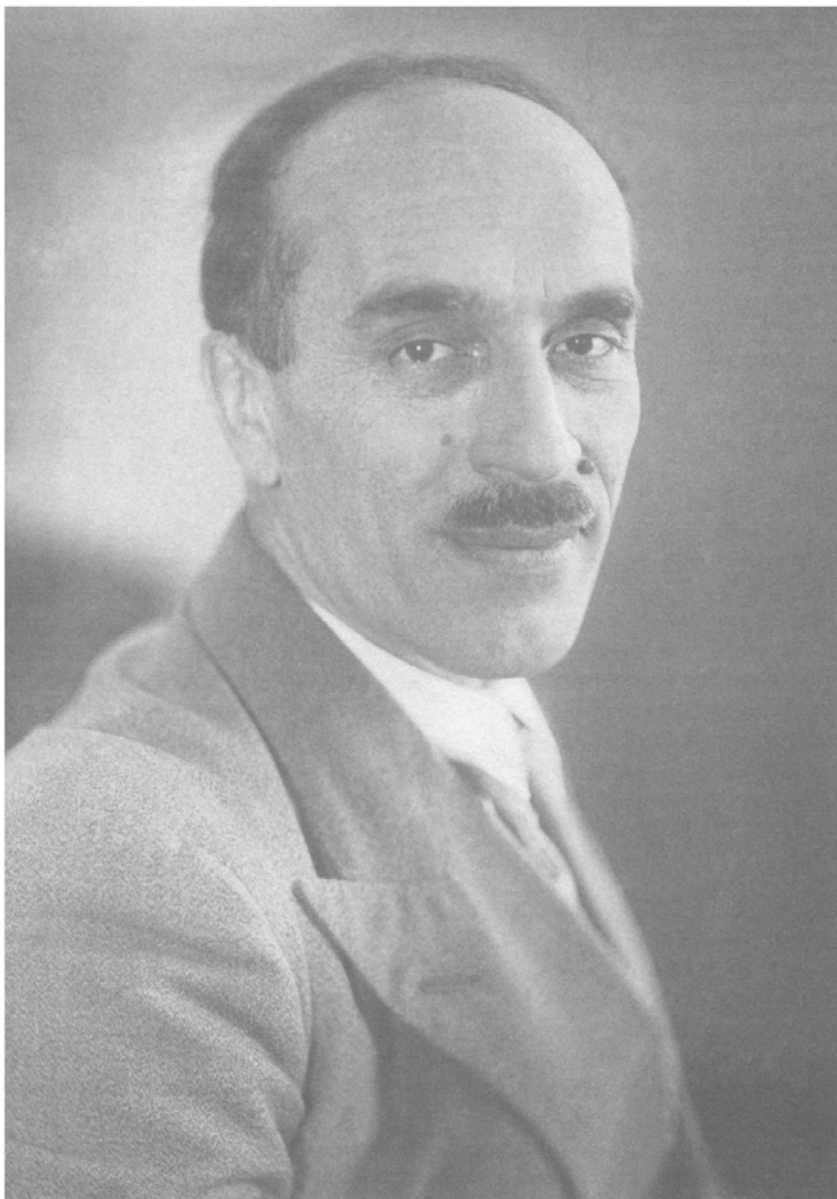
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9. N. N. Semenov (1896–1986), winner of the 1956 Nobel Prize in chemistry.

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10. T. D. Lysenko (1898–1976), promoter of a theory of genetics based on the inheritance of acquired characteristics and tyrant of Soviet biology from 1948 to 1965. Photo courtesy of the Institute of the History of Science and Technology, Moscow.

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11. I. V. Kurchatov (1903–1960), physicist who was the leader of the Soviet atomic bomb project. Photo courtesy of the Institute of the History of Science and Technology, Moscow.

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12. A. N. Kolmogorov (1903–1987), outstanding Soviet mathematician.
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Moscow.*

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13. N. I. Vavilov (1887–1943), Soviet biologist who died in prison, a victim of Lysenkoism. Photo courtesy of the Institute of the History of Science and Technology, Moscow.

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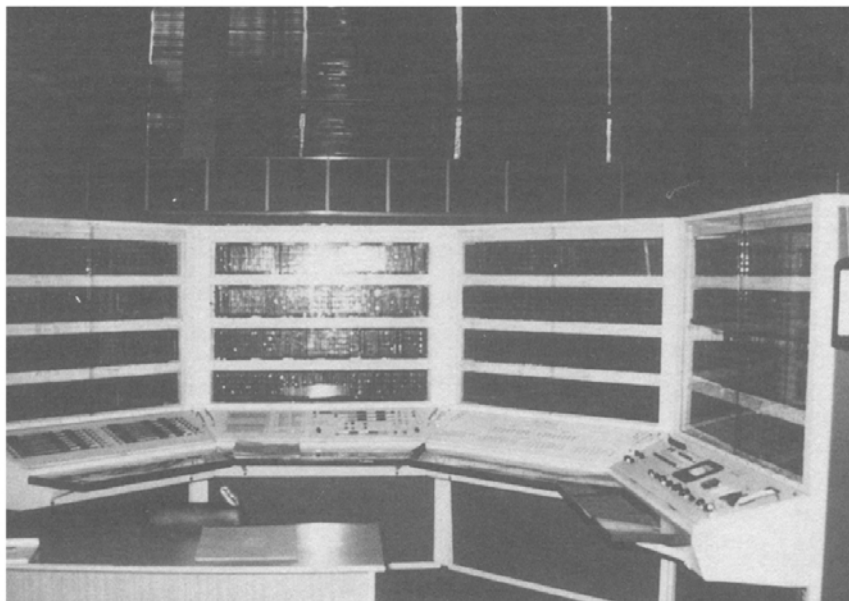
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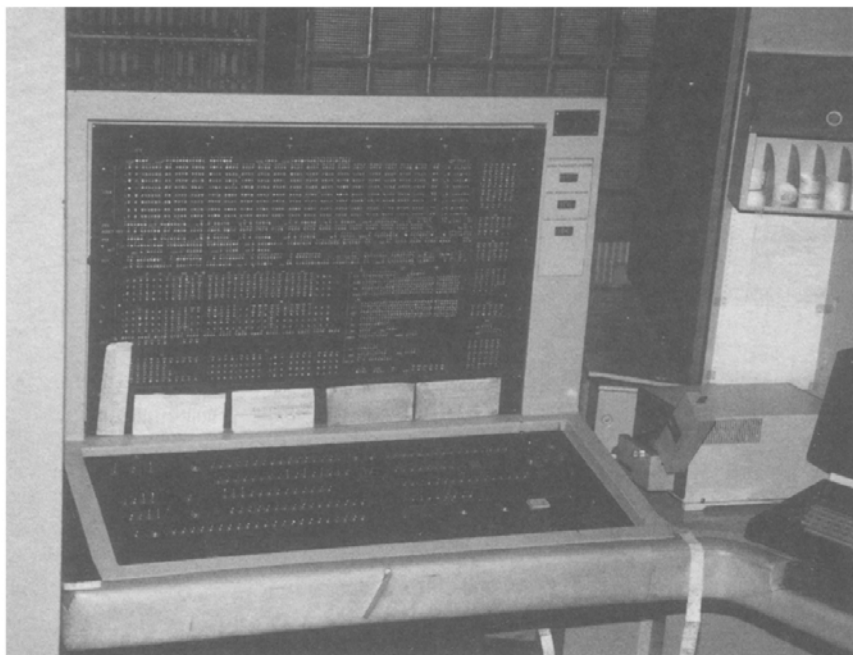
14. P. L. Kapitsa (1894–1984), Nobel Prize-winning Soviet physicist who worked with Ernest Rutherford in England from 1924 to 1934 but who was detained by Stalin when visiting the Soviet Union in 1934 and was forced to move his research laboratory from Cambridge to Moscow. Photo courtesy of the Institute of the History of Science and Technology, Moscow.

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15. BESM-6, Soviet second-generation computer produced in the 1960s.
Photo courtesy of Gregory Crowe.

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16. Elbrus-II, a leading Soviet computer of the early 1990s. Photo courtesy of Peter Wolcott.

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17. *A. D. Sakharov (1921–1989), a leading physicist in the construction of the Soviet hydrogen bomb, later famous dissident and critic of the Soviet regime. Photo taken during his 1988 visit to the United States. AP/Wide World Photos.*