Book Reviews

Istoriia Akademii Nauk SSSR [History of the Academy of Sciences of the U.S.S.R.]. vol. 1, *1724–1803*. K. V. Ostrovitianov, Ed. Academy of Sciences of the U.S.S.R. Press, Moscow, 1958 (in Russian). 483 pp.

During the 17th century Russia had neither secular schools nor scientific centers. The religious academies in Kiev and Moscow had a monopoly on the search for "higher knowledge" which consisted of sporadic efforts to interpret the tenets of Eastern Orthodoxy in terms of scholasticized Aristotelian philosophy. The great physical synthesis, crowning the scientific achievements of such 17th-century giants as Galileo, Kepler, Descartes, and Newton, did not produce even a feeble echo in Russia. It is doubtful whether any printed presentations of Copernicus' heliocentric ideas were available in Russian before the translation of Varenius' *Geographia generalis* in 1718.

Peter I, who gave a healthy impetus to the growth of scientific thought in Russia, worked on several fronts with varying successes. First he founded several secular schools, such as the Moscow school of mathematics and navigation (1701), which in 1715 was transferred to St. Petersburg and renamed the Naval Academy. He also organized several medical schools and so-called ciphering schools in the provincial capitals. Peter sponsored and guided various scientific projects; for example, he was responsible for the preparation of a map of the Caspian Sea for the Paris Academy of Sciences and for the dispatch of D. G. Messerschmidt to Siberia to look for medical herbs and to make a preliminary survey of the natural resources. Thousands of books confiscated in the Baltic states provided a nucleus for the establishment of the first Russian public library in 1714 which subsequently became the library of the Academy of Sciences. In 1719 the Chamber of Curiosities (*Kunstkammer*) was opened in St. Petersburg, and it soon became an unusually rich museum of natural specimens and ethnographic material. Peter also sponsored an ambitious translation project: many Western books on engineering, astronomy, and general scientific topics were published in the newly instituted civic script (used for the publication of secular books—that is, books not subject to Church censorship). Peter's last contribution in the field of scientific and educational endeavor was the founding of the St. Petersburg Academy of Sciences, which began to function in 1725, several months after his death.

The history of the St. Petersburg Academy from 1724 to 1803 is the subject of this bulky volume, written by some 25 experts in the history of science. The work on this book was started in 1949, the year in which the Communist party's attack on "cosmopolitanism" had reached its peak. The original intention of the editors was to produce a volume showing the "national character" of "Russian science" and the Russian priority in many scientific discoveries. The original manuscript, which apparently echoed this philosophy, was discarded, and the present volume was prepared under the guidance of a new group of editors, who have succeeded in producing a comparatively sober and documented study.

The Academy was founded after careful and painstaking preparations made by Peter and a small group of his advisers. During his Western trips, Peter became acquainted with the organization and activities of the Royal Society in London and the Paris Academy of Sciences. He also consulted Leibniz, Christian Wolff, J. N. Delisle, and Fontenelle. While most of his Western advisers urged him to abandon the idea of a high forum dedicated exclusively to scientific research and to concentrate on founding a university, Peter decided to combine the two. The new Academy was in a way a cultural paradox. Russia was not in a position to supply the new institution with learned members; the country could not even supply students for the academic university. Thus not only the first scholars but also the first students were imported. The Russian educational system was a pyramid standing upside down: its top was built before its base.

During the period covered by this book, the Academy had a total of 111 members (including the regular members and the "adjuncts"): 85 foreigners and 26 Russians. For a long time it was viewed by the government with pronounced disfavor, by the Church with a great deal of suspicion, and by the country's semiliterate gentry with open disdain. In the beginning it was a part of Russia's body politic, but not an organic component of Russia's culture. The process of its integration into Russian culture was painfully slow and was not completed before the 1860's.

From 1724 to 1803, according to the authors of this book, the Academy passed through three distinct phases. The first phase (1724–41) was dominated by administrative absolutism and bitter strife between so-called German and Russian factions. However, with the help of its library, press, and several museums and laboratories, the Academy immediately became a going concern. The *Commentarii,* the Academy's scholarly publication, reached every intellectual center of Europe. Among the members during this period were such great names as Daniel Bernoulli, the founder of modern hydrodynamics, and Leonhard Euler, one of the 18th century's most illustrious mathematicians. During the same period, J. N. Delisle became the country's first defender of the heliocentric system and a champion of a mathematical approach to astronomical questions.

The second phase (1742–65), during which Euler was a member of the Berlin Academy of Sciences, saw the rise to prominence of Mikhail V. Lomonosov, whose limitless energy earned him honors in many fields of intellectual endeavor. Because his ideas, fraught with Cartesian philosophy, were quite complex and some of his key papers were available only in manuscript form, Lomonosov's contemporaries did not fully appreciate his acumen and contributions. In his scientific work he combined daring specula-

tion with meticulous experiment. He worked on such diverse scientific questions as the conservation of matter, atmospheric electricity, the origin of icebergs, the composition of the earth's layers, and the origin and distribution of minerals in Russia. His interest went far beyond the limits of natural science: he argued eloquently against the Norman theory of the origin of the first Russian state, wrote tragedies on direct orders from the imperial court, and prepared papers on demographic questions and on the improvement of crafts, industries, and agriculture in his native land.

During this period the Academy's internal conflict grew unchecked, many foreign scholars left Russia, and the recruitment of new scientists with established reputation became an extremely difficult assignment. The Academy's first charter, promulgated in 1747, ignored Peter's intention to grant this institution the right "to rule itself" and made it an agency of the central government; the Assembly of Academicians was *de facto* subordinated to the academic office which was in the hands of appointed officials who often had little respect for scientific work. Despite all these difficulties, the Academy became an institution with firm roots. An impressive list of foreign scholars were elected corresponding and honorary members, and the ties with the learned societies of Western Europe made intellectual relations between the East and the West a two-way traffic.

The third phase (1766–1802), which began 1 year after Lomonosov's death and in the year of Euler's return to St. Petersburg, saw a comparative increase in the ratio of Russian scholars: of 40 newly elected academicians and "adjuncts," 14 were Russians. The work of the Academy was dominated by two major scientific concerns: the continuation of Euler's work in mathematical analysis and the large-scale natural-scientific expeditions to various parts of Russia during the late 1760's and early 1770's. After his return to St. Petersburg, Euler completed some 300 papers; in this he was helped by N. Fuss and other students. At the time of his death in 1783, eight members of the Academy were his disciples. They wrote on various topics in mathematical analysis and astronomy, translated several of Euler's works into Russian, and worked on the mathematical curriculum for the newly founded primary and secondary public schools. They played an important part in the building of a great mathematical tradition in Russia. The natural-scientific expeditions, dominated by an empirical-descriptive approach, produced large quantities of valuable geographical, geological, botanical, zoological, and other information. P. Pallas' *Travels in Various Provinces of the Russian Empire*, published in German in 1771–73, was soon translated into Russian, French, and English.

In the course of this period, the Academy ceased to be the country's only scientific institution. The University of Moscow, founded in 1755, began to assert itself by the end of the century, although on a very small scale. Various government departments sponsored and participated in special research projects. This was particularly true for the medical, mining, and commerce departments which were active in natural-scientific expeditions. In 1765 the Free Economic Society was established; it conducted research in various natural sciences related to agriculture and regularly published its *Works*. In 1783 the Russian Academy was founded and immediately undertook an intensive study of language and literature. In all these research bodies the influence of the Academy of Sciences was paramount. Paradoxically, as a reaction to the ideological influences of the French Revolution, Paul I assigned the Academy the unenviable task of serving as the chief censor of books imported from the West. This censorship, which was strictly applied for a short time, kept from Russia not only the books espousing the political ideas generated by the French Revolution but also those dealing with many natural-scientific topics.

While this book contains much information and is an important contribution to the intellectual history of 18th-century Russia, it has a number of rather obvious shortcomings.

The authors have made no effort to hide their nationalist bias. All Russian scholars are treated in tender terms and are pictured as saints unsusceptible to ordinary human frailties. On the other hand, Russia's foreign scholars are seen as mere human beings, many of them honest and dedicated, but most of them, including Euler, subject to human weaknesses.

The role of Lomonosov has been blown so much out of proportion that the total picture of the growth of scientific thought in 18th-century Russia has been somewhat distorted. Despite the magnificient compass of Lomonosov's genius, his influence was actually one-sided: he provided a much-needed inspiration to the sparse ranks of Russian scientists, but he did not influence their scientific interests and their theoretical and methodological orientations. Neither of the two general scientific concerns of the Academy—mathematical analysis and the empirical-descriptive study of the country's natural resources—was a continuation of Lomonosovian tradition.

The authors have not explored adequately the changing attitudes of various social classes toward science, the philosophy of Catherine II's enlightened absolutism, the impact of educational policies on scientific work, or in general, the nature of the conflict between official ideology and the theoretical orientations and aspirations of individual sciences. They have thrown only partial light on the multiple forces which influenced the growth of scientific attitude as a part of Russian culture.

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Virus Hunters. Greer Williams. Knopf, New York, 1959. xix + 503 pp. Plates. $5.95.

The effective science popularizer has to surmount the double hurdles of factual accuracy and alluring presentation. In *Virus Hunters*, Greer Williams manages to mount both these barriers in telling what he describes as possibly the biggest "double take" in the history of medical science. He recites first the story of the classical microbe hunters, starting with Edward Jenner, and then the exciting activities of virologists in recent decades.

Williams retraces the drama told by Paul de Kruif in *Microbe Hunters* (1926), but adds to the story the research work of such people as Wendell M. Stanley, Ernest W. Goodpasture, Thomas Francis, Jr., Max Theiler, Richard E. Shope, John F. Enders, Jonas E. Salk, Albert B. Sabin, and Heinz Fraenkel-Conrat.

Aware (as he points out in his book) that many physicians felt that de Kruif, an ex-bacteriologist, was "a popular medical writer who too often went overboard," Williams tries to curb some of