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Source: *Isis*, Vol. 64, No. 4 (Dec., 1973), pp. 484-503

Published by: The University of Chicago Press on behalf of The History of Science Society

Stable URL: <https://www.jstor.org/stable/229645>

Accessed: 01-05-2019 02:06 UTC

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The Reception of Darwin's *Origin of Species* by Russian Scientists

By James Allen Rogers*

I. INTRODUCTION

MANY TSARIST RUSSIAN OBSERVERS have commented that Darwinism met less resistance in Russia in the 1860s than it did in Western Europe.¹ Why this was so has never been adequately explained. The enthusiastic acceptance of Darwinism in Russia resulted largely from special Russian conditions,² but it also owed something to the relation of Charles Darwin to the young Russian scientists interested in his work. Darwin often said that he looked to younger scientists for confirmation and elaboration of his theory, and he was not disappointed with the reception his theory received in Tsarist Russia: "A Russian who is translating my new book into Russian has been here," Darwin wrote to Charles Lyell in 1867, "and says you are immensely read in Russia, and many editions—how many I forget. Six editions of Buckle and four editions of the 'Origin.'"³

Received Dec. 1971; revised/accepted Oct. 1972.

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¹ F. M. Dostoevsky, *Diary of a Writer*, trans. Boris Brasol, 2 vols. (London: Cassell, 1949), Vol. I, pp. 150, 316. See also S. S. Glagol'ev in *Bogoslovskii vestnik* (The theological herald), 1912, p. 651, as quoted in G. L. Kline, "Darwinism and the Russian Orthodox Church," in E. J. Simmons, ed., *Continuity and Change in Russian and Soviet Thought* (Cambridge, Mass.: Harvard University Press, 1955), p. 308.

² These "special Russian conditions" as they relate directly to the reception of the *Origin of Species* by Russian scientists are the subject matter of this article. The relationship of Darwinism to the intellectual and social conditions of Russia in the 1860s, which is summarized in the conclusion of this article, is treated in detail in my article "The Russian Populists' Response to Darwin," *Slavic Review*, Sept. 1963, 456–468 and in "Marxist and Russian Darwinism," *Jahrbücher für Geschichte Osteuropas*, June 1965, 199–211.

³ Francis Darwin, ed., *The Life and Letters of Charles Darwin*, 3 vols. (London, 1887), Vol. III,

p. 73. Darwin's new book was *The Variation of Animals and Plants under Domestication* (London, 1868). It was translated into Russian by the paleontologist Vladimir Kovalevsky and the physiologist I. M. Sechenov from the English galley proofs, which Darwin mailed to Kovalevsky. Kovalevsky was able to secure illustrations before the English publisher did, and the Russian edition was published a year earlier as *Izmeneniia zhivotnykh i rastenii vsledstvie prirucheniia*, 2 vols. (St. Petersburg, 1867). The Russian visiting Darwin was Vladimir Kovalevsky. With the help of his brother, Alexander, and Sechenov's wife, M. A. Sechenova-Bokova, Kovalevsky also translated and edited Darwin's *The Expression of the Emotions in Man and Animals* as *Vyrazhenie oshchushchenii u cheloveka i zhivotnykh* (St. Petersburg, 1872), which appeared at the same time as the English edition. M. A. Sechenova-Bokova also translated Darwin's *Descent of Man, and Selection in Relation to Sex*, 2 vols. (London, 1871) into Russian as *Proiskhozhdenie cheloveka i podbor po otnosheniui k polu*, 2 vols. (St. Petersburg, 1871–1872). Charles Lyell's book mentioned by Darwin was his *Principles of Geology*, 3 vols. (London, 1830–1833), which had

Darwin was concerned that the *Origin of Species* reach naturalists across the world, but translations of that complicated work raised problems for Darwin. If he found it difficult to make the reader “understand what is meant” in England and America, at least in those two countries he and the reader were discussing the *Origin of Species* in the same language. Foreign language editions raised not only the thorny question of translating Darwinian terms, but also the problem of translators, who often thought it proper to annotate their editions to explain the “significance” of Darwinism.⁴ The first Russian translation of the *Origin of Species* (1864) appeared, however, without any comment whatever by the translator, Sergei A. Rachinsky, professor of botany at the University of Moscow. Rachinsky had begun the translation in 1862 and published an article on Darwinism while continuing work on the translation in 1863.⁵

The foreign editions of the *Origin of Species* not only brought Darwin some problems of translation, they also unexpectedly brought him claims of precedence in the discovery of natural selection. This was sometimes confused with the idea of biological evolution itself. The history of biological evolutionary theory, a belief in the mutability of species, goes back at least to classical Greece. Darwin had not claimed to be the discoverer of evolution but only of a particular process of evolution—natural selection. To separate his theory from his predecessors, Darwin prefaced the third edition of the *Origin of Species* with “An Historical Sketch of the Progress of Opinion on the Origin of Species.”⁶

II. CHRISTIAN H. PANDER

Among the earlier evolutionists noted by Darwin in his historical sketch were several Russian subjects of Baltic origin. One of these, Christian H. Pander, Darwin mentioned only in passing in a footnote:

From references in Bronn’s “Untersuchungen über die Entwicklungs-Gesetze,” it appears that the celebrated botanist and palaeontologist Unger published, in 1852, his

been banned in Russia during the reign of Nicholas I. Henry Thomas Buckle’s *History of Civilization in England*, 2 vols. (London, 1858) had a great vogue among advocates of science in Russia because of its supposedly scientific approach to history.

⁴ The first German translator, Professor H. G. Bronn, a zoologist and paleontologist, made a painfully literal translation of the *Origin of Species* and thought it proper to annotate the German edition of 1860, adding his comments to those of Darwin’s. Nonetheless the first German edition brought Darwin many comments on his theory. To improve the German translation Darwin asked Professor Victor Carus of Leipzig to translate the fourth English edition of 1866 into German. (*Life and Letters of Darwin*, Vol. II, pp. 276–280, 357; Vol. III, pp. 48–50, 60.) Mlle. Clémence Royer made the first French translation in 1862 and did not hesitate to add a preface “explaining” the significance of Darwin’s theory. It went into a second edition which Darwin took “infinite pains” to correct. When a French third edition appeared without his authorization,

Darwin ordered a new translation from J. Moulinié (*ibid.*, Vol. II, p. 387).

⁵ “Tsvety i nasekomye” (Flowers and insects), *Russkii vestnik* (The Russian herald), Jan. 1863. Rachinsky’s translation went into a second edition in 1865. It was eventually replaced by the translation of Kliment A. Timiriazev in 1895. Dmitri Pisarev exaggerated when he criticized Rachinsky’s translation for its errors, infelicities in translation, and misprints. Pisarev asserted that when the publisher attempted to improve the translation by appending a list of *errata*, he unfortunately inserted a list of *errata* for another book. Dmitri Pisarev, “Progress v mire zhivotnykh i rastenii” (Progress in the world of animals and plants), *Sochineniia*, 6 vols. (St. Petersburg, 1897), Vol. III, p. 490.

⁶ This was changed in the last edition to read: “An Historical Sketch of the Progress of Opinion of the Origin of Species Previously to the Publication of the First Edition of this Work.” Before Darwin included an historical sketch in the third edition, Professor Bronn had added an historical sketch to his German translation which later appeared also in the American edition.

belief that species undergo development and modification. Dalton, likewise, in Pander and Dalton's work on Fossil Sloths, expressed, in 1821, a similar belief.⁷

Pander was much admired by his contemporary Karl Ernst von Baer for his pioneering work in embryology and paleontology. The opinion of von Baer, as will be apparent later, was highly valued by Darwin. Von Baer had such great respect for Pander that he dedicated his important work on the ontology of animals to him.⁸ Von Baer and Pander became close friends at the University of Dorpat, which Pander entered in 1812. Pander, who came from an old and prosperous merchant family of Riga, later studied at Berlin and Göttingen. Von Baer then persuaded him to study embryology in Würzburg. In 1817 Pander published his doctoral dissertation on the development of the chicken embryo. There he described in great detail the changes which take place the first five days in the development of the germ layer of the blastoderm of the chicken egg. Although Caspar Wolff had already demonstrated that the blastoderm differentiated itself into germ layers, Pander described how the germ layers differentiate themselves into the various organs of the growing chicken.⁹ It was another blow to the advocates of preformation, who believed that the germ cell contained the organism fully developed in microscopic size.¹⁰

By his work in embryology Pander occupied the middle place between the pioneering discoveries of Wolff in the middle of the eighteenth century and the fully developed theories of von Baer in the second quarter of the nineteenth century. It was an exceptional achievement for a man of twenty-three. Pander's dissertation had been beautifully illustrated by Eduard d'Alton, with whom Pander had become good friends in Würzburg. In 1818 they set out on a journey to Western Europe to gather material for Pander's research on the comparative study of the bones of vertebrates. It was in this work on comparative osteology that Pander developed a consistent theory of evolu-

⁷ Morse Peckham, ed., *The Origin of Species by Charles Darwin. A Variorum Text* (Philadelphia: University of Pennsylvania Press, 1959), "Historical Sketch," 60, 1-2.

⁸ Karl Ernst von Baer, *Ueber die Entwicklungsgeschichte der Thiere: Beobachtung und Reflexion*, 2 vols. (Königsberg, 1828-1837).

⁹ C. H. Pander, *Beiträge zur Entwicklungsgeschichte des Hühnchens im Eie* (Würzburg, 1817). Caspar Wolff had first published his theory of epigenesis in 1759 as his doctoral dissertation at Berlin: *Theoria generationis* (Berlin, 1759). This was later elaborated as *Theorie von der Generation* (Berlin, 1764). Caspar Wolff's work on the development and differentiation of the blastoderm in the intestinal canals of chickens was published in Latin in St. Petersburg in 1768. It remained unknown to most scholars until it was translated into German and published posthumously as *Ueber die Bildung des Darmkanals im bebrüteten Hühnchen* (Halle, 1812). Von Baer later wrote of this study: "Es ist die grösste Meisterarbeit, die wir aus dem Felde der beobachtenden Naturwissenschaften kennen," *Bulletin de l'Académie Impériale des Sciences*, St.

Petersburg, 1847, 5:153.

¹⁰ From 1762 evolution (or preformation) meant the growth of preexisting forms or organisms fully developed in microscopic size in the germ cell. The modern meaning of evolution in the sense of a process of development from earlier and less developed forms dates from 1832, the year of the publication of the second volume of Charles Lyell's *Principles of Geology*. An alternative terminology for biological evolution common in the nineteenth century was transmutation or development. Transmutation in the biological sense of the transmutation of species goes back at least to the seventeenth century, but in the nineteenth century it was usually attributed to Lamarck. The development theory in biology is another way to describe transmutation. It was also attributed to Lamarck as well as to Robert Chambers, whose *Vestiges of Creation* (1844) was subtitled *Hypothesis of the Development of the Vegetable and Animal Kingdom*. The term transformism, which is occasionally encountered in nineteenth-century writings, is an archaic form of transmutation or development. In this article the term evolution will be used only in its modern sense.

tion.¹¹ This was the work to which Darwin referred, although he attributed the theory of Pander to d'Alton.

Pander returned to Russia in 1819 and was made a full member of the Russian Academy of Sciences in 1826. He later went home to Riga to work on the data on paleontology that he had gathered over the years. In 1842 he returned to St. Petersburg to the Department of Mines to use its extensive collection in paleontology. During these years he published several monographs in paleontology that established his eminence in the field. Dedicated entirely to his research, he refused all offers of professorships, wrote no popular articles or books, nor gave fashionable lectures to the public. After Pander's death in 1865 his friend von Baer wrote:

Science was deprived of a man, who was dedicated to it to his last breath with a sincerity and honesty that rarely occur. He never made use of science to better his own position—this would have seemed to him a profanation of science. Unfortunately, he did not even have a pardonable, perhaps even desirable, love for glory in science. It is necessary to add “unfortunately,” because his broad and lively interests led him to carry out many investigations whose results he did not publish.¹²

III. ALEXANDER KEYSERLING

The second Russian subject cited by Darwin in his historical sketch had a different career in science from that of Pander. This was Count Alexander Keyserling, from an old German family of Courland. Keyserling's family had become Russian subjects during the time of Peter I. After his education at the University of Berlin, Keyserling traveled in Europe and came to know many famous scientists, such as Alexander von Humboldt and von Baer.¹³ Keyserling's basic training was in geology and paleontology. In 1841 he accompanied the famous expedition of Sir Roderick Murchison in Russia.¹⁴ Keyserling proved particularly helpful to Murchison's expedition by his competence in geology and by his close acquaintance with the Russian minister of finance, Count Egor Krankin. As a result Murchison's expedition was unusually well equipped to undertake its task: to systematize and map the geological structure of Russia. The published results of the expedition appeared in English in 1845 and in Russian in 1849.¹⁵

Keyserling enjoyed great prestige in the field of geology.¹⁶ He worked also in zoology

¹¹ C. H. Pander and Eduard d'Alton, *Vergleichende Osteologie*, 14 vols. (Bonn, 1821–1831).

¹² B. E. Raikov, *Russkie biologi-evoliutsionisty do Darvina* (Russian biological-evolutionists before Darwin), 4 vols. (Moscow/Leningrad, 1951–1959), Vol. II, p. 238.

¹³ Keyserling's life is summarized in his *Ein Lebensbild aus seinem Briefen und Tagebüchern* (Berlin, 1902).

¹⁴ Murchison eventually became, after a short study at Oxford in the 1820s, one of England's greatest geologists. See Archibald Geikie, *Life of Sir Roderick Murchison*, 2 vols. (London, 1875).

¹⁵ R. I. Murchison, E. de Verneuil, and A. von Keyserling, *The Geology of Russia in Europe and*

the Ural Mountains, 2 vols. (London, 1845). This enterprise did much to stimulate the study of geology in Russia, although the subject had been studied there at least since the eighteenth century. I am indebted to Mr. George Carver for showing me his unpublished paper on the work of Vasili Severgin in geology in Russia in the eighteenth century.

¹⁶ When N. Ia. Danilevsky published his anti-Darwinist work, *Darvinizm: Kriticheskoe izsledovanie* (Darwinism: A critical investigation), 2 vols. (St. Petersburg, 1885–1889), the Russian Imperial Academy of Sciences, to whom the work was submitted for a prize, sent it to Keyserling for his opinion.

and had arrived at a theory of evolution before the publication in 1859 of the *Origin of Species*. Darwin referred to his theory when he wrote in his historical sketch:

In 1853 a celebrated geologist, Count Keyserling ("Bulletin de la Soc. Geolog.," 2nd Ser., tom. x., p. 357), suggested that as new diseases, supposed to have been caused by some miasma, have arisen and spread over the world, so at certain periods the germs of existing species may have been chemically affected by circumbient molecules of a particular nature, and this has given rise to new forms.¹⁷

If Darwin's description of Keyserling's article is not clear, it is because Darwin doubted that he understood it.¹⁸ Keyserling had written in his article that the variation of species arose from the effect of "alien molecules" acting on the chemical constitution of the embryo. These molecules were supposedly carried by a miasma which appeared at periodic intervals.¹⁹

Darwin sent Keyserling an advance copy of the *Origin of Species*. But Keyserling continued to believe for a time that species changed too regularly, as if by some chemical law, for natural selection to be the major cause of change.²⁰ By 1886, however, Keyserling wrote that he had come to accept most of Darwin's "hypothesis": "I renounced my views which contradicted Darwin's theory, and I consider that the changes of the embryo arise not by means of external action of certain molecules but by the influence of selection and heredity."²¹

The belief in a miasma (a floating mist, usually at night) containing infectious or noxious material was common in the nineteenth century. By building a theory of the variation of species upon this commonplace, Keyserling had demonstrated the ingenuity of a highly competent but not original mind. Unlike Pander, he built his theory within the existing structure of thought rather than by challenging the structure itself.

IV. KARL ERNST VON BAER

The third Russian citizen mentioned by Darwin in his historical sketch combined both the originality of Pander and the worldliness of Keyserling. "Von Baer, towards whom all zoologists feel so profound a respect," Darwin wrote, "expressed about the year 1859 (see Prof. Rudolph Wagner, 'Zoologisch-Anthropologische Untersuchungen,' 1861, s. 51) his conviction, chiefly grounded on the laws of geographical distribution, that forms now perfectly distinct have descended from a single parent-form."²² While Darwin felt such "profound respect" for Karl Ernst von Baer, it was not until the third edition of the *Origin of Species* that Darwin referred to him by name. It is significant that even then Darwin mentioned von Baer's work only through a secondary source; Darwin's interpretation of von Baer's ideas indicated little acquaintance with the original work in German. Darwin's knowledge of German was weak and he probably received von Baer's ideas secondhand through Thomas Henry Huxley.²³

¹⁷ *Origin of Species*, "Historical Sketch," 61.

¹⁸ *Life and Letters of Darwin*, Vol. II, p. 261.

¹⁹ "Note sur la succession des êtres organisés," *Bulletin de la Société Géologique en France*, 1852-1853, 10: 355-389.

²⁰ Darwin to Lyell, Jan. 4, 1860, *Life and Letters of Darwin*, Vol. II, p. 261.

²¹ Raikov, *Russkie biologi-evoliutsionisty*, Vol. IV, p. 637.

²² *Origin of Species*, "Historical Sketch," 68.1:d.

²³ Nora Barlow, ed., *The Autobiography of Charles Darwin, 1809-1882*, with original omissions restored (London: Collins, 1958), p. 27.

Huxley had been one of the major champions of von Baer in England. "I learned the meaning of Morphology and the value of development as the criterion of morphological views," Huxley wrote in 1859, "first, from the study of the Hydrozoa during a long voyage, and secondly, from the writings of von Baer."²⁴ Huxley later secured for von Baer the coveted Copley Medal in science which had once been awarded to Darwin.²⁵ When Huxley first read the published version of Darwin's *Origin of Species*, he could think of no higher praise than to compare it with the works of von Baer: "Since I read von Baer's essays, nine years ago," he wrote to Darwin, "no work on Natural History Science I have met with had made so great an impression upon me. . . ."²⁶

Von Baer also saw a connection between the *Origin of Species* and his own work: "I have expressed the same ideas on the transformation of types or origin of species as Mr. Darwin," von Baer wrote to Huxley in 1860. "But it is only on zoological geography that I rely. You will find, in the last chapter of the treatise, 'Ueber Papuas und Alfuren,' that I speak of it very firmly without knowing that Mr. Darwin was occupied with this subject."²⁷ Huxley took this to mean approval of Darwin's theory, and he wrote to Darwin that he had found "a new and great ally." Darwin immediately replied, "If you write to von Baer, for heaven's sake tell him that we should think one nod of approbation on our side, of the greatest value; and if he does write anything, beg him to send us a copy, for I would try and get it translated and published. . . ."²⁸ But Huxley was quite wrong in his belief that he had found a new ally for the theory of natural selection. The work of von Baer had already pointed in a different direction.

Von Baer was born in Estonia of German parents who were Russian subjects. He studied at Dorpat, Würzburg, and Königsberg, where he received his first academic appointment. The publication in 1828 of the first volume of his imposing study on the ontogeny of animals made his scientific reputation. He reported in detail, as had Pander, his observations of the embryonic development of certain organisms. He found nothing to support either the theory of preformation or the current belief of Johann Meckel in embryonic recapitulation. Meckel believed that each higher organism passes during its embryonic development through the same forms which characterize fully developed organisms lower in the evolutionary scale. As a result of his research, von Baer denied the existence of embryonic recapitulation as it had been elaborated by Meckel and introduced instead several theories about the development of the embryo which have come to be known as von Baer's laws.²⁹

T. H. Huxley had been so impressed with the work of von Baer that he translated parts of it into English in 1853. This included von Baer's refutation of Meckel's argument from embryonic recapitulation and the belief that all forms are developed out of one.³⁰ How much of Huxley's translation Darwin read is not known. Darwin did mention von Baer's work in embryology by name in the third and succeeding editions of the *Origin of Species*. Darwin had actually quoted von Baer in the first two

²⁴ Leonard Huxley, ed., *Life and Letters of Thomas Henry Huxley*, 2 vols. (New York: D. Appleton, 1901), Vol. I, p. 174.

²⁵ *Ibid.*, p. 325.

²⁶ Nov. 23, 1859, *Life and Letters of Darwin*, Vol. II, p. 230.

²⁷ Huxley to Darwin, Aug. 6, 1860, *ibid.*, pp. 329-330.

²⁸ *Ibid.*, p. 123.

²⁹ A. W. Meyer, *Human Generation* (Stanford: Stanford University Press, 1956), pp. 59-66.

³⁰ A. Henfrey and T. H. Huxley, *Scientific Memoirs* (London, 1853).

editions but had attributed the quotations to Louis Agassiz by mistake. After giving von Baer proper recognition in the third edition, Darwin used von Baer's work, or misused it, to find in the argument from embryonic recapitulation a splendid proof of organic evolution.³¹

Von Baer saw himself as an unintentional contributor to Darwin's theory by three of his works:

In the work which carries the title, "Ueber die Entwicklungsgeschichte der Thiere," I have demonstrated the transformations of animal organisms in the development of individuals, but I believe that I have not spoken a word in support of a theory of descent, in the sense of the newer one [Darwin's].³²

The second contribution was a theory that some related animals may have developed from a common form, but that it was unlikely that all animals have come from a primal form through the transformation of species.³³ The third contribution was contained in the article on zoological geography which von Baer had mentioned to Huxley.³⁴

Despite von Baer's claims, it is doubtful that Darwin ever saw the second and third articles which von Baer mentioned or that they had any influence on the writing of the *Origin of Species*. The second article was published originally in an obscure journal and only reprinted in 1864. The third article was printed in late 1859 when the *Origin of Species* was already in press. Von Baer was more justified to claim that his work in embryology had contributed to Darwin's theory.³⁵ Von Baer also noted emphatically

³¹ *Origin of Species*, XIII, 234–244.

Darwin seemed unaware that von Baer had found evidence repudiating the argument from embryonic recapitulation more than three decades before. But Sir Gavin de Beer suggests that Darwin had already "recognized in his *Sketch of 1842* that during its embryonic development an animal does not climb up its phylogenetic tree. . . . Repetition of ancestral developmental stages, not their abbreviated recapitulation is the kernel of the evidence that Darwin was the first to draw from embryology, to show that embryonic similarity was a consequence of heredity in community of descent, and evidence for evolution." "The Evolution of Charles Darwin," *New York Review of Books*, Dec. 17, 1970. De Beer attributed the later statement of Darwin concerning embryonic recapitulation to his "unfortunate" acceptance of the views of Ernst Haeckel and others. Michael Ghiselin disagrees with the criticism of Haeckel's biogenetic law (ontogeny recapitulates phylogeny). He asserts that Haeckel's law in its full form is sufficiently qualified to include apparent exceptions and to be of use to Darwin. See his *The Triumph of the Darwinian Method* (Berkeley/Los Angeles: University of California Press, 1969), pp. 122–123. Speculations on how Darwin came to "misinterpret" von Baer's work are explored in Jane Oppenheimer, "An Embryological Enigma in the *Origin of Species*," in Bentley Glass, Owsei Temkin, and W. L. Strauss, eds., *Forerunners of*

Darwin: 1745–1859 (Baltimore: The Johns Hopkins Press, 1959), pp. 292–322.

³² *Reden, gehalten in wissenschaftlichen Versammlungen und kleinere Aufsätze vermischten Inhalts*, 2 vols. (St. Petersburg, 1864–1876), Vol. II, p. 241.

³³ This theory was presented in a lecture in Königsberg in 1833 or 1834 and then printed in an obscure journal. See *ibid.*, Vol. I, p. 37. In his later comments on this article von Baer wrote: "But I definitely remarked that I did not find anything that suggested that all animals develop by the aid of transformation" (*ibid.*, Vol. II, p. 245).

³⁴ "Ueber Papuas und Alfuren," *Mémoires de l'Académie Impériale des Sciences de St. Petersburg*, 1859, 8: 270–346.

³⁵ What von Baer contributed to Darwinism depends upon how Darwin's use of embryologic evidence is interpreted. Oppenheimer ("An Embryological Enigma," p. 322) suggests: "What Darwin took from von Baer emanated from von Baer's speculations about the whole embryo, or at most about the whole organ. He never so much as mentioned the most important factual contribution of von Baer to embryology, his descriptions of the germ layers, though it was these which provided the phenomenological basis for von Baer's conclusions and for the new embryology to follow. Darwin may have believed, as he said he did, that his embryological considerations were vital to the successful develop-

that Darwin had not contributed to the development of his own theories about evolution. He felt it necessary to point out that he had written his article on the transformation of species before he had read the *Origin of Species*:

I already had it with me when I visited England in 1859 and I gave it to Messrs. Huxley and Owen together with another article on distinctive skulls of various peoples from the Petersburg collections. It was at this time that I first learned that Charles Darwin was occupied with a complete demonstration of the transmutation doctrine. The book was not yet in print. I became acquainted with it only after my return to Petersburg at the end of the year.³⁶

Many scientists opposed Darwin's theory in the beginning, but none gave so much of themselves over so long a period as did von Baer. Nor were many of Darwin's opponents of the eminence and ability of von Baer. From the publication of the first volume of his great work on embryology, von Baer's career had been a series of triumphs, and his opinion was sought and valued. In 1834 he had moved to St. Petersburg where he had been elected to the Academy of Sciences. There he continued to make recognized contributions to the full spectrum of European scientific life. He started scientific journals, founded learned societies, and did basic research in fields from physical anthropology to ichthyology.³⁷

When the *Origin of Species* was published in 1859 von Baer was in his late sixties. In his letter to Huxley of 1860 von Baer wrote that he would probably publish something about Darwin's theory.³⁸ In the 1870s he gave the last years of his life to the writing of a long book against Darwin's "hypothesis," as he preferred to call it. That a man in his eighties should have produced such a work is unusual in itself. That von Baer at that age was forced by blindness to construct this book-length treatise in his mind before dictating it, and to conjure from his memory many of the references, is the most eloquent testimony to his personal fears of the influence of Darwin's theory.³⁹

Although von Baer resolutely opposed the theory of natural selection, his own writings often showed him to be more of a Darwinist than he realized.⁴⁰ Von Baer had suggested the probability that related forms of animals were descended from a common form:

If they call me a predecessor of Darwin's hypothesis on that basis, then I have nothing against this; but I must object if they attribute to me the view that all animals, including the higher, evolve as descendants from the most simple organisms. In this respect I am not a Darwinist and I am able to agree only with those who call me neither a Darwinist nor an anti-Darwinist.⁴¹

Von Baer's objection expressed a fundamental conviction about the origin of man which runs through all his writings and is very explicitly argued from a developmental

ment of his concepts of natural history. But what he accepted from von Baer to further them was drawn from von Baer's reflections more than from his observations. What von Baer described that was new Darwin mainly ignored."

³⁶ Von Baer, *Reden*, Vol. II, p. 248.

³⁷ Karl Ernst von Baer, *Nachrichten über Leben und Schriften* (St. Petersburg, 1865); Ludwig Stidda, *Karl Ernst von Baer, Eine biographische Skizze* (Braunschweig, 1878).

³⁸ Huxley to Darwin, Aug. 6, 1860, *Life and Letters of Darwin*, Vol. II, pp. 329–330.

³⁹ Von Baer, *Reden*, Vol. II, pp. 235–479.

⁴⁰ The equivalent of von Baer in England was Sir Charles Lyell, whose work on inorganic evolution, *Principles of Geology* (1830–1833), had led so many along the road to inorganic and organic evolution, including Darwin himself. But Lyell refused, for a longer period than any of Darwin's close associates, to accept organic evolution. See Huxley's interpretation of this in *Life and Letters of Darwin*, Vol. II, p. 190.

⁴¹ Von Baer, *Reden*, Vol. II, p. 252.

view of social evolution in the last part of his work against Darwin's theory. Animals have instincts which help preserve the species, but men have in addition reason and enlightened feelings which ennoble human existence. The intellectual and moral powers cannot be the product of materialistic agents and mechanistic processes that are found in Darwin's theory of natural selection. The noble side of man and the harmony of the universe point to an underlying plan which the laws of nature have only followed in the evolution of the animal world. "In short," von Baer concluded, "I cannot deny evolution, but I cannot agree with the theory of natural selection by which Darwin wants to explain evolution."⁴²

Pander, Keyserling, and von Baer were the only three Russian scientists of significance mentioned by Darwin in his historical sketch.⁴³ Unknown to Darwin, Russian naturalists had been investigating the possibilities of the mutability of species since the eighteenth century. In the history of Western science many discoveries appear to have been foreshadowed by Aristotle. In Russia the only equivalent to an Aristotle was the

⁴² *Ibid.*, p. 433. Von Baer's research had done much to discredit the metaphysical evolutionary theory of *Naturphilosophie* and to put the study of evolution on an empirical basis. Yet in his attack on Darwinism he retained the teleological assumptions of a developmental view of human social evolution. Later in life he discovered his affinity for Aristotelian reasoning about history which only reinforced his developmental view of human evolution. See Robert E. MacMaster, *Danilevsky: A Russian Totalitarian Philosopher* (Cambridge, Mass.: Harvard University Press, 1967), p. 341, n. 41. For diverse interpretations of von Baer's opposition to Darwinism see also S. J. Holmes, "K. E. von Baer's Perplexities over Evolution," *Isis*, 1947, 37:7-14; and Meyer, *Human Generation*. Alexander Vucinich, *Science in Russian Culture, 1861-1917* (Stanford: Stanford University Press, 1970), pp. 75-76, offers a different and valuable interpretation of von Baer's opposition to Darwinism based on the peculiarities of the institutionalized structure of Russian science: "It was on behalf of academic conservatism that Karl von Baer opposed Darwinism, even though the embryological research of his younger days was an important part of the mainstream of evolutionism." Vucinich explains that von Baer was a member of the Imperial Academy of Sciences, which tended to insulate itself from new discoveries in the natural sciences in a vested interest in its own work: "It was the university professor rather than the Academician who introduced Darwinism to Russian audiences. . . ." The Russian Imperial Academy of Sciences could not, however, ignore Darwin's monumental discovery, but its basic attitude toward Darwinism was evident in the election of Darwin to membership in 1867. The Academy praised Darwin's research in general but carefully separated this praise from the *Origin of Species* by emphasizing that this book contained more errors than any of Darwin's other work.

See G. A. Kniazev, "Izbranie Charlz Darvina chlenom-korrespondentom Peterburgskoi Akademii nauk" (The election of Charles Darwin as a corresponding member of the Petersburg Academy of Sciences), *Priroda* (Nature), (1931), No. 11:118-120. See also *Life and Letters of Darwin*, Vol. III, p. 376.

⁴³ The only other evolutionist working in Russia mentioned by Darwin was Karl Friedrich Burdach (*Origin of Species*, "Historical Sketch," 60.4.) Burdach studied at Leipzig and later taught at Kharkov and Dorpat universities. When he became head of the Anatomical Institute at Königsberg he invited von Baer there and encouraged him in his research. See Burdach's *Rückblick auf mein Leben. Selbstbiographie* (Leipzig, 1848). The only other figure prominent in the Russian world of science mentioned by Darwin in the *Origin of Species* was Peter Pallas. Born in Germany, educated in Holland and England, he went to Russia to serve Catherine II when he was twenty-six and a recognized naturalist. His interests were encyclopedic, and he was one of the major forces in stimulating the scientific study of nature in Russia. Darwin was interested in Pallas because of the observations of animals made by Pallas in his travels in Russia. Although Pallas is mentioned only once in the *Origin of Species* (VIII, 73), he is cited numerous times in Darwin's *Descent of Man*. Several pages are extant in Darwin's handwriting of an abstract of Pallas' *Mémoire sur la variation des animaux* published in 1870. See *Memorials of Charles Darwin* (2nd ed., London: British Museum, 1910). Pallas does not belong, however, to Darwin's historical sketch. He was a believer, after a brief flirtation with the idea of the mutability of species, in preformation; consequently he was hostile to the theory of Caspar Wolff which suggested that preformation was impossible. See Eric Nordenskiöld, *The History of Biology* (New York: Tudor, 1935), pp. 262-263.

polymath Mikhail Lomonosov. It would be presumptuous, however, to claim that the Russian Aristotle had conceived a theory of evolution. He only discussed some elements of evolution, a common phenomenon among eighteenth-century naturalists. In his work on the strata of the earth's crust, Lomonosov raised the question of how the shells of mollusks came to rest on the tops of mountains. He reasoned that the layers of sediment containing the shells must have risen from sea level in the process of building up the layers of the mountains.⁴⁴ This was not an unusually brilliant explanation for its time, but it was more profound than that of his contemporary Voltaire, who thought that such shells had been dropped on the mountain tops by pilgrims returning from the Near East.⁴⁵

In the interval between Lomonosov's work and Darwin's *Origin of Species* many Russian naturalists investigated and speculated on the possibility of organic and inorganic evolution.⁴⁶ Such scientific activity at this period in Russia, a counterpart of similar investigations in Western Europe, should not be surprising. Although Russia appeared in some aspects undeveloped by Western European standards, the country was not undeveloped in the eighteenth century in the sense that term is used in the twentieth century to describe the emerging nations of Africa and Asia. Tsarist Russia traditionally forced development from the top of the pyramid downward, and Russia had produced her own scientists, as well as importing scientists of international eminence, long before the bulk of her peoples had crossed the threshold of literacy.

V. KARL ROUILLIER

Darwin should have listed in his historical sketch the Russian zoologist Karl Rouillier, who did more than anyone in Russia to prepare his country to accept the theory of natural selection. Darwin did not list Rouillier because the two men were unacquainted with each other's work. After the appearance of the *Origin of Species* the professor of comparative anatomy at Moscow University wrote:

This theory was not the same one we had heard from Rouillier, but it was something so similar and so related to that which Rouillier had taught us, that the new theory seemed to us something long known, only brought into greater focus in a more exact scientific form, and in particular, furnished with an incomparably greater collection of factual evidence.⁴⁷

Rouillier had been well prepared for the study of evolution. He graduated from the Medical-Surgical Academy in 1833 where he had studied under Iustin Diad'kovsky, whose own research had convinced him of the mutability of species. Rouillier went to study in Germany in the summer of 1841 and on his return wrote an article criticizing the theory that species were unchanging entities.⁴⁸ The following year at the age of

⁴⁴ Mikhail Lomonosov, *O sloiakh zemnykh* (1763) (The earth's strata) (Leningrad, 1949).

⁴⁵ Voltaire's explanation was a rebuttal to those who thought the sea shells deposited in the rock strata of the Alps were proof of the Biblical Deluge. See Gertrude Himmelfarb, *Darwin and the Darwinian Revolution* (New York: Doubleday, 1962), p. 111.

⁴⁶ Most of these pre-Darwinian naturalists

have been described in Raikov's four-volume work cited above.

⁴⁷ Iakov A. Borzenkov, *Rechi* (Speeches) (Moscow, 1881), p. 42.

⁴⁸ "Somneniia v zoologii, kak nauke" (Doubts about zoology as a science), *Izbrannye biologicheskie proizvedeniia* (Selected biological works) (Moscow, 1954), pp. 9-29.

twenty-eight he was appointed to the chair of zoology at Moscow University. He began to develop a theory of evolution in the late 1840s which he expressed in a series of three public lectures in the early 1850s.⁴⁹ Rouillier was an excellent orator and his public lectures had already made him famous.⁵⁰ These new public lectures, however, brought him into conflict with the Tsarist government. Rouillier had submitted an outline of the lectures to the Minister of Education in advance. He had not equivocated about the contents in any way. The lectures clearly stated that animals were continuously changing and evolving. The Minister of Education, Prince Shirinskii-Shikhmatov, approved the outline on December 20, 1850, but it later became evident that he either had not read it or had not grasped its significance.⁵¹

Rouillier gave his three lectures to an enthusiastic audience. Later he prepared the lectures for publication with a collection of lectures given by other professors of Moscow University. Before the book was published in 1852 Rouillier asked Mikhail Katkov, editor of *Moskovskie vedomosti* (Moscow gazette), to publish part of his lectures to acquaint the public with the forthcoming book. Katkov agreed and half of the second lecture appeared under the title "On the First Appearance of Plants and Animals on Earth."⁵²

Ten days later the Minister of Education came across the article in *Moskovskie vedomosti* and began an investigation. When it is remembered that this article was part of a lecture approved in advance in December of 1850, delivered on February 3 to a large public gathering, and prepared for publication in a book in early January 1852, it suggests that the efficiency of Tsarist Russian censorship can easily be overstated.⁵³ The Minister of Education was very much disturbed by the article, which seemed in conflict with the teachings of the sacred Scriptures. That it had been read by the many readers of *Moskovskie vedomosti* was even more alarming. He wrote General Vladimir Nazimov in Moscow and asked him to obtain an explanation from Katkov, to stop the printing of the book containing Rouillier's lectures, and to have the university carefully watch the "tone and tendencies" of Rouillier's lectures. The urgency of the request suggests that the Minister of Education may have been as alarmed by his own negligence in approving the lectures as by anything else.⁵⁴

General Nazimov not only sent back a letter of explanation from Katkov, but also one from Professor Stepan Shevyrev, dean of the faculty of philosophy, and an additional opinion from D. S. Rzhnevsky, a member of the Moscow Censorship Committee. Katkov put forth a double defense: that he printed the lecture of Rouillier only

⁴⁹ "О влинии наружных условий на жизнь животных" (On the influence of external conditions on animal life), *ibid.*, pp. 30–56.

⁵⁰ Alexander Herzen, e.g., heard his public lectures with pleasure and wrote an article on them for *Moskovskie vedomosti*, Dec. 8, 1845, No. 147. See his *Sobranie sochinenii*, 30 vols. (Moscow, 1954–1963), Vol. II, pp. 14–150.

⁵¹ Raikov, *Russkie biologi-evoliutsionisty*, Vol. III, pp. 187–188.

⁵² *Moskovskie vedomosti*, 1852, No. 4.

⁵³ Censorship at this time was technically under the control of the Ministry of Education. Its actual functioning was far more complex, which may account for some of its inefficiency.

See Sidney Monas, *The Third Section* (Cambridge, Mass.: Harvard University Press, 1961), pp. 229–282.

⁵⁴ The anxiety of the Minister of Education over the possible "atheistic tendencies" of Rouillier's lectures may be related to the general anxiety still felt in official circles over the discovery of the Petrashevsky circle two years previously. An official investigator had compared the *Petrshhevsti* to the French Encyclopedists of the eighteenth century in that they weakened the religious feelings of the French people and prepared the way for the revolution of 1789. *Ibid.*, p. 257.

after it had been previously passed by the censor, and that there was nothing in Rouillier's lectures that contradicted the sacred Scriptures. Professor Shevyrev insisted that there was no conflict between Rouillier's theory of evolution and that of sacred Scripture which Shevyrev interpreted symbolically. The opinion of the Moscow censor was that he found nothing criminal in Rouillier's lectures.⁵⁵

The Minister of Education found these defenses inaccurate and hypocritical. He gave the lecture to another censor, V. I. Kuznetsov, who found that "the theories of Mr. Rouillier are not only in disagreement with sacred Scripture but contradict them."⁵⁶ Using this "evidence" the Minister of Education notified Rouillier that the publication of the book containing his lectures as well as those of his colleagues would be allowed on only one condition:

. . . namely if Professor Rouillier is willing to add to them a general conclusion in which, having called all his conclusions which disagree with sacred Scriptures simply hypotheses or assumptions to which the mind of man is led by the *scientific method*, he then addresses himself to the truth of revelation and positively states that the creation of the world was truly and inexorably brought about only as it is told in the Book of Genesis.⁵⁷

Rouillier's new conclusion duly noted that "Hypotheses, assumed by science with regard to theories about the original formation and population of the earth, are of value only to the degree in which they accord with the indisputable evidence of God's word."⁵⁸ Although Rouillier may have written the new conclusion only to release his own lectures and those of his colleagues for a wider dissemination to the public, Rouillier's views on the relation between religion and evolution are not known. The two most complete accounts of Rouillier's interpretation of evolution are found in these public lectures and in the course on zoology which he taught at Moscow University. His lecture notes were lithographed for distribution to the students, and the government did not object to their content. Rouillier had always been careful in his lecture notes to state that man was not an animal and had been created separately from other organisms.⁵⁹

In the early 1850s the Moscow Society of Naturalists began a journal, *Messenger of the Natural Sciences*,⁶⁰ to popularize scientific discoveries. Rouillier, as editor of this publication, soon made it a lively and influential weekly in the years before his death in 1858. The following year the *Origin of Species* made its appearance. The first notice in the Russian press about Darwin's theory appeared in 1860 in an article by H. Trautschold, a member of the Moscow Society of Naturalists. He had read the *Origin of Species* in Bronn's translation and found that it agreed with his own research on the

⁵⁵ Raikov, *Russkie biologi-evoliutsionisty*, Vol. III, pp. 193–196.

⁵⁶ *Ibid.*, p. 197.

⁵⁷ *Ibid.*, pp. 199–200.

⁵⁸ *Ibid.*, pp. 200–201. The official religious reaction to Darwinism followed the example set by the government in its treatment of Rouillier's views on evolution. Between 1873 (the first mention of Darwinism in the ecclesiastical press) and 1916, the journals of the ecclesiastical academies published in all some twenty articles against Darwinism. Konstantine Pobedonostsev, procurator of the Holy Synod, refused to allow the

publication in the Synod's official journal, *Tserkovnye vedomosti* (The church gazette), of an article by S. A. Rachinsky, Russian translator of the *Origin of Species*, which proposed the essential harmony of Darwinism and Christianity. For a full discussion of the official religious reaction against Darwinism see Kline, "Darwinism and the Russian Orthodox Church."

⁵⁹ "Obshchaia zoologiya" (General zoology), *Proizvedeniia*, pp. 76–134.

⁶⁰ The Russian title was *Vestnik estestvennykh nauk*.

transmutation of species.⁶¹ Shortly thereafter a translation of Huxley's review of the *Origin of Species* for the *Westminster Review* appeared in the *Messenger of the Natural Sciences*.⁶²

Professor Stepan Semenovich Kutorga, a geologist who had been profoundly excited by the Murchison-Keyserling expedition in Russia, found Darwin's new theory irresistibly attractive. He highly praised Darwin's book to his class at St. Petersburg University in the autumn of 1860, although he believed that other important factors in the evolutionary process besides natural selection would undoubtedly be discovered in the future. In a review of Darwin's book Professor Kutorga concluded: "Of all the theories of the origin of species, the theory of Darwin is undoubtedly the most logical, the most satisfying and at the same time one of the most simple. Science acquires in this theory the truth that natural selection is the strongest force in the formation of species."⁶³

VI. VLADIMIR KOVALEVSKY

Russian scientists soon wrote to Darwin to exchange their views with him. "I had a pamphlet from Moscow the other day," Darwin noted in 1861, "by a man who sticks up famously for the imperfection of the 'Geological Record,' but complains that I have sadly understated the variability of the old fossilized animals!"⁶⁴ To carry Darwinism beyond the views of Darwin was not uncommon among the younger scientists in Russia who received his theory with great enthusiasm. Vladimir Kovalevsky, one of the most enthusiastic Darwinists in Russia, visited Darwin in 1867 and told him that four editions of the *Origin of Species* had been published in Russia and had been warmly received by scientific and social thinkers alike.⁶⁵

Kovalevsky had an extraordinarily varied career. The son of a small landowner, he was sent to St. Petersburg at the age of twelve to begin preparation for an education in law. But that type of education held little interest for him, and he began to make his own living by doing translations from various Western European languages. At nineteen he went abroad to Heidelberg, Paris, and Nice. He spent 1861–1862 in London, where he came to know Alexander Herzen. He took part in the Polish uprising of 1863 and then returned to St. Petersburg, where he translated and published a large number of books in science and other fields. At the end of 1866 he went to Italy as a journalist and followed Garibaldi's campaign to liberate Rome. In 1867 he was at Down visiting Darwin. When he returned to Russia that year, Kovalevsky prepared a Russian edition of Darwin's *Variation of Animals and Plants under Domestication*.⁶⁶ Kovalevsky

⁶¹ "Uebergänge und Zwischenvarietäten," *Bulletin de la Société Impériale des Naturalistes de Moscou*, 1860, 4:519–530.

⁶² Dec. 1860, pp. 130–132. T. H. Huxley's review, "Darwin on the Origin of Species," had originally appeared in the *Westminster Review*, Apr. 1860, pp. 295–310.

⁶³ An unsigned review in *Biblioteka dlia chteniia* (Library for reading), Dec. 1861, p. 33. The first part of this review appeared in the previous issue, pp. 1–25.

⁶⁴ Darwin to Henry Fawcett, Sept. 18, 1861,

Francis Darwin and A. Seward, eds., *More Letters of Charles Darwin*, 2 vols. (New York: D. Appleton, 1903), Vol. I, p. 196.

⁶⁵ *Life and Letters of Darwin*, Vol. III, p. 73.

⁶⁶ See S. Ia. Shtraikh, *Sem'ia Kovalevskikh* (The Kovalevsky family) (Leningrad, 1948), pp. 219–220 for details on the Russian edition of Darwin's *Variation of Animals and Plants under Domestication*. This work also contains much information on the life and letters of Vladimir and Alexander Kovalevsky.

visited Darwin again in September 1870 and found him working on the *Descent of Man*. They discussed some of Darwin's ideas, and when the book was published in 1871, Darwin twice mentioned observations of Kovalevsky that he had found valuable.⁶⁷

In 1872 Kovalevsky took a doctorate in paleontology at the University of Jena. The following year he asked Darwin for permission to dedicate a monograph to him. Darwin had recently read a paper by Kovalevsky and he replied:

I thank you for your extremely interesting letter. Your paper in the Proc. of the Royal Soc. appeared to me a very valuable contribution to science; and if I had known your address I would have written to you at the time. . . . I am extremely glad to know that you have been successful in your further researches. The dedication of which you speak will be very gratifying to me, and I look on it as a great honor.⁶⁸

Kovalevsky published his monograph in Germany in 1873. He prefaced it with his opinion about the fruitful application of Darwinism to paleontology. He also added his personal opinion of Darwin in making the dedication of the monograph:

That I am able to dedicate this treatise to you gives me great happiness not because I consider it completely worthy of such a dedication, but because this gives me an opportunity to express the profound respect which I personally feel for you. From the very beginning of my studies, you have been for me the best teacher and the best friend: to all my works you always gave full attention and created the possibility for my researches during my protracted visit to England. Thanks to your intercession many collections and libraries were opened to me, which otherwise would, perhaps, have remained closed.⁶⁹

By this time Kovalevsky felt that he was a part of the scientific world of Darwin's England, and he almost wept when he heard the rumor of Huxley's death. He wrote to his brother to propose a subscription for Huxley's family. "This is a loss not only for science," he added, "but for the intellectual side of English society as well."⁷⁰ But Darwin replied to Kovalevsky that the news of Huxley's death was quite wrong; Huxley, in fact, had never been so healthy as at that time.⁷¹

The intellectual ability and generous temperament of Vladimir Kovalevsky had impressed Darwin. He predicted that Kovalevsky had before him "a grand career."⁷² But Kovalevsky's personal life pulled him in other directions. In 1868 he contracted a fictitious marriage with Sophia Korvin-Krukovskaia to free her from the tyranny of the Russian "nobleman's nest" and to allow her to study abroad. The radical youth of the 1860s sometimes resorted to this device to emancipate young women from the despotism of Russian family life. Readers of Nikolai Chernyshevsky's popular novel of the period, *What Is To Be Done?* (1863), will recognize the prototype of this arrangement in that work.

⁶⁷ Darwin, *The Descent of Man, and Selection in Relation to Sex*, Vol. II, pp. 45 and 49.

⁶⁸ Letter of May 21, 1873, in Charles Darwin, *Izbrannye Pis'ma* (Selected letters) (Moscow, 1950), pp. 232-237. Vladimir's paper to which Darwin referred was "On the Osteology of the Hypopotamidae," *Proceedings of the Royal Society*, 1873, 21:147-165.

⁶⁹ *Monographie der Gattung Anthrasotherium* (Cassel, 1873). A copy of this monograph was

found in Darwin's library after his death. H. W. Rutherford, ed., *Catalogue of the Library of Charles Darwin* (Cambridge:Cambridge University Press, 1908).

⁷⁰ Letter of Apr. 1874, Shtraikh, *Kovalevskikh*, p. 228.

⁷¹ Letter of June 3, 1874, *ibid.*

⁷² Darwin to Vladimir Kovalevsky, May 21, 1873, Darwin, *Pis'ma*, p. 237.

In the case of the Kovalevskys, however, the marriage was consummated after the death of Sophia's father, General Krukovsky, but the marriage remained unstable and unreal in many ways. Kovalevsky and his wife were separated for long periods when they were both studying abroad. After the birth of a daughter, and well before Kovalevsky's suicide in 1883, they had for all purposes separated. Sophia Kovalevskaja continued her own studies in mathematics in Germany. Later she became professor of mathematics at the University of Stockholm, where she made several distinguished contributions to mathematics before her early death in 1891.⁷³ Her husband made no major contributions to science after the middle 1870s; he became involved in various business speculations which ultimately failed, and he killed himself by chloroform in 1883 at the age of forty-one.⁷⁴

VII. ALEXANDER KOVALEVSKY

Although Darwin had corresponded primarily with Vladimir Kovalevsky, he also followed the work of Vladimir's brother, Alexander. Alexander graduated from St. Petersburg University in 1862 and studied at Tübingen and Heidelberg, where he worked under the first German translator of the *Origin of Species*, H. G. Bronn. Alexander's interest in biology early turned to the study of evolutionary embryology, which led him to undertake research in Naples.⁷⁵ His work on the Ascidians for his doctoral dissertation in 1867 caught the attention of Darwin. "I am much obliged to you for telling me about your brother's work," Darwin wrote to Vladimir in 1873.⁷⁶ After discussing the details of Alexander's work on the Sagitta (an organism which Darwin had studied earlier), Darwin concluded, "If I am right in my supposition, few men will have made such fine discoveries as your brother with respect to his case and that of the Ascidians."⁷⁷ Darwin had already found Alexander's work on the Ascidians very important for developing his argument in the *Descent of Man*. The Ascidians are small marine organisms which in the adult form have no vertical column. But Alexander discovered in his researches on the fetal forms of the Ascidians that they were closely related to vertebrate forms in their manner of development, in the relative position of their nervous system, and in their dorsal structure.⁷⁸

Alexander's research led Darwin to speculate that the argument from embryonic recapitulation could be carried back beyond the vertebrates to nonvertebrates. The Ascidians might then be considered in their earliest form the ancestor of the vertebrates (including man), while their present form showed a regression to a nonvertebrate character. Darwin believed that if Alexander's research should be confirmed by

⁷³ See Sophia Kovalevskaja, *Vospominaniia i pis'ma* (Memoirs and letters) (Leningrad, 1951), for her highly romantic account of her life.

⁷⁴ On Vladimir Kovalevsky, his life and his contributions to science, see also L. Sh. Davitashvili, *V. O. Kovalevsky* (Moscow, 1951), A. A. Borisiak, *V. O. Kovalevsky* (Leningrad, 1928), and A. N. Severtsov, *Morfologicheskie zakonomernosti evoliutsii* (Morphological regularities of evolution) (Leningrad, 1939), pp. 478–537.

⁷⁵ On Alexander Kovalevsky, his life and his

contributions to science, see also Il'ia Mechnikov, "Aleksandr Onufrievich Kovalevsky," *Vestnik Evropy* (Messenger of Europe), Dec. 1902, pp. 772–799.

⁷⁶ Darwin to Vladimir Kovalevsky, May 21, 1873, Darwin, *Pis'ma*, p. 237.

⁷⁷ Vladimir transmits to Alexander the compliments of Darwin in a letter in Shtraikh, *Kovalevskikh*, pp. 223–224.

⁷⁸ *Mém. Acad. Imp. Sci. St. Petersbourg*, 1866, 10, No. 15.

other investigators, "the whole will form a discovery of the very greatest value."⁷⁹ Von Baer found Darwin's interpretation implausible, saying, "I consider it fantastic to search among the Ascidians for the predecessors of man,"⁸⁰ and he prepared a monograph on the question of whether the larvae of the Ascidian did develop in the manner typical of the vertebrates.⁸¹

VIII. KLIMENT ARKADEEVICH TIMIRIAZEV

Despite von Baer, Darwinism was enthusiastically accepted in Russia by naturalists and social thinkers alike. The Kovalevsky brothers, Rouillier, and the other Russian evolutionists did much to smooth the way for Darwinism in Russia and even to contribute something to the development of the theory. But the scientist who did the most to propagate Darwinism in Russia was Kliment Arkadeevich Timiriazev. He played a role in Darwinism in Russia similar to that of Huxley in England: he was the popularizer and protector of the theory of natural selection.

Timiriazev came from an old noble family and had been tutored at home as a boy. From his mother he gained fluency in French and English at an early age. By the age of fifteen he earned his living by doing translations, primarily of English novels. In 1860 he entered St. Petersburg University where he first heard about Darwin's theory from Professor Kutorga, who told his class that the theory was new but sound.⁸² Excited by the implications of natural selection, Timiriazev resolved to read the *Origin of Species* in English. He soon gave a paper on Darwinism to a student group directed by Andrei N. Beketov, professor of botany, who had accepted the idea of the mutability of species.⁸³ Timiriazev's student paper became the basis for a series of articles on Darwin's theory which he wrote four years later for the Russian press.⁸⁴ Here Timiriazev showed himself a clear and arduous propagandist of Darwinism, a self-appointed task which he continued to the end of his long life. In 1868 he went abroad to continue his studies at Heidelberg and Paris. While abroad, he became friends with Vladimir and Sophia Kovalevsky. When he returned to Russia it was to accept a post as

⁷⁹ Darwin, *Descent of Man*, Vol. I, pp. 205–206: "It thus appears," wrote Darwin after discussing the discovery of Alexander Kovalevsky, "if we may rely on embryology, which has always proved the safest guide in classification, that we have at last gained a clue to the source whence the Vertebrata have been derived. We should thus be justified in believing that at an extremely remote period a group of animals existed, resembling in many respects the larvae of our present Ascidians, which diverged into two great branches—the one retrograding in development and producing the present class of Ascidians, the other rising to the crown and summit of the animal kingdom by giving birth to the Vertebrata."

⁸⁰ Von Baer, *Reden*, Vol. II, p. 344.

⁸¹ *Entwickelt sich die Larve der einfashen Ascidiën in der ersten Zeit nach dem Typus der Wirbelthiere?* (St. Petersburg, 1873).

⁸² *Biblioteka dlia chteniia*, Dec. 1861, p. 33.

⁸³ Andrei N. Beketov had written on evolution

before the publication of Darwin's *Origin of Species* in his "Garmoniiia v prirode" (Harmony in nature), published in *Russkii vestnik* in 1860. Beketov later translated Darwin's *Journal of Researches into the Natural History and Geology of the Countries Visited During the Voyage of H.M.S. Beagle Bound Round the World* (2nd ed., London, 1845) as *Puteshestvie vokrug svet na korable Bigl'*, 2 vols. (St. Petersburg, 1865).

⁸⁴ "Kniga Darvina, ee kritiki i kommentatory" (Darwin's book, its critics and commentators), *Otechestvennye zapiski* (Notes of the fatherland), 1864, No. 8: 880–912; No. 10: 650–685; No. 12: 859–882. These articles were later printed in a book, *Kratkii ocherk teorii Darvina* (A short sketch of Darwin's theory) (St. Petersburg, 1865). Later they were included in a larger book, *Charlz Darvin i ego uchenie* (Charles Darwin and his theory) (Moscow, 1882), which contained other writings of Timiriazev about Darwin and Darwinism.

teacher of botany in the Petrovsky Academy of Agriculture and Forestry. He held that position until 1892 and was also made professor of botany at Moscow University from 1877.

In July of 1877, while Timiriazev was abroad for a conference, he had an interview with Darwin. This was unusual because Darwin's poor health generally prevented him from receiving visitors. Timiriazev had taken to Western Europe a copy of his own book on Darwin's theory in the hope that he might be able to use it as an excuse to visit Darwin. He had inscribed the book to Darwin in English "with profound respect and unbounded admiration."⁸⁵ Timiriazev had also obtained a letter of introduction to Sir Joseph Hooker, director of the botanic gardens at Kew and a close friend of Darwin's.

When Timiriazev arrived at Kew, he was received not by Hooker but by his assistant, W. Thistelton Dyer, who showed him about the gardens. Dyer kindly but firmly told Timiriazev that it was impossible for him to visit Darwin at Down. He finally agreed, however, to give Timiriazev a letter to Darwin's son, Francis. Timiriazev took the train out from London to a station near Down. But when he asked the station-master where he could get a carriage to take him to Down he was told, "I fear you are in the wrong place."⁸⁶ Timiriazev nonetheless found the road to Down and walked the long distance to Darwin's house, where he was admitted by a servant to see Francis Darwin. Timiriazev was again told politely that it would be impossible for him to talk with Charles Darwin. He presented his book to Francis Darwin and prepared to leave. But Francis asked him to stay a minute and meet his mother. Timiriazev did so and talked for several minutes with Mrs. Darwin when, without advance notice, Charles Darwin entered the room. Timiriazev was quite startled at the sudden appearance of his hero. He was greatly relieved that Darwin did not diminish his stature by beginning their conversation in the manner Timiriazev had too often encountered in Western Europe where the polite inquiry concerned only the degree of frost and the quantity of bears in Russia.⁸⁷

Instead they talked of science in general and of botany in particular, since Darwin at this time was just beginning his work on the power of movement in plants. Darwin showed Timiriazev some of the experiments he was then carrying out. Darwin remarked that he took great pleasure in the young Russian scientists, who had become such warm partisans of his theory, and he mentioned in particular Kovalevsky. Timiriazev asked him which Kovalevsky brother he meant, suggesting that he probably had in mind Alexander. "No, excuse me," replied Darwin, "in my opinion the work in paleontology of Vladimir has greater significance."⁸⁸ Timiriazev, recalling this anecdote, explained that he stressed it for his Russian readers because the unfortunate Vladimir was not appreciated at his true worth in his own country.⁸⁹ After about two hours of conversation, Darwin took leave of Timiriazev to rest. He remarked to Timiriazev before leaving: "At this minute you will meet in this country many foolish

⁸⁵ K. A. Timiriazev, "U Darvina v Daune" (At Darwin's in Down) in *Nauka i demokratia* (Science and democracy) (Moscow, 1920; reprinted 1963), p. 105.

⁸⁶ *Ibid.*, p. 106.

⁸⁷ *Ibid.*, p. 110.

⁸⁸ *Ibid.*, p. 113. Darwin had in mind the series

of monographs on the fossils of horses written in 1872-1873 by Vladimir.

⁸⁹ Professor I. F. Sintsov of Odessa University had refused to accept the dissertation defense of Vladimir Kovalevsky in 1873, although he had displayed his competence in the subject by publishing two highly praised treatises on paleontology.

people, who think only of involving England in a war with Russia, but rest assured that in this house there is sympathy for your side, and every morning we pick up the paper with the wish to read news of your victories.”⁹⁰

Timiriazev later wrote Dyer to thank him for indirectly arranging the interview with Darwin: “Never will I forget that thanks to you I had the good fortune to see in the course, alas, of several hours, the greatest genius of all time.” Dyer thanked Timiriazev for the details of the visit and added, “Darwin often told me after your visit what pleasure it gave him meeting and talking with you.”⁹¹

Until the 1880s Timiriazev had been primarily a propagator of Darwinism. His function as protector of the theory of natural selection had not yet been severely tested. Unlike England, where the opposition to Darwinism broke out immediately on the publication of the *Origin of Species* and then dwindled into insignificance within a decade, in Russia the religious as well as conservative opposition to Darwinism was extraordinarily slow to develop. The heaviest attack on Darwinism came only in 1885 with the publication of N. A. Danilevsky’s massive book against the theory of natural selection. Timiriazev quickly came to the defense of Darwinism in a series of public lectures and articles.⁹²

IX. CONCLUSION

Timiriazev’s remarkable success in the propagation and defense of Darwinism came not only from his prestige as a pioneer in the study of photosynthesis but also from his open advocacy of liberal and radical political views.⁹³ The natural sciences in general, and Darwinism in particular, were intimately related to politics in Russian social and revolutionary thought.

This situation was not unique to Russia. In Western Europe Darwinism also acquired political significance. But there was a difference. Darwinism in Western Europe acquired adherents of all hues on the political spectrum, who read Darwinism in the light of their own political experience and doctrine.⁹⁴ Their relative freedom to separate their political from their religious beliefs, to express those political beliefs, and to

⁹⁰ Darwin was referring to the Russo-Turkish war which had begun several months earlier, on Apr. 27, 1877. Darwin shared the views of Gladstone, who had raised tremendous agitation in England against Turkish rule in the Balkans by his pamphlet on the “Bulgarian horrors.”

⁹¹ Timiriazev, *Charlz Darvin i ego uchenie*, p. 9. Dyer later asked Darwin for advice on buying equipment for the gardens at Kew. Darwin replied, “But Timiriazev of Moscow, who traveled over Europe to see all Bot. Labs., and who seemed so good a fellow, would, I should think, give the best list of the most indispensable instruments.” *More Letters of Charles Darwin*, Vol. II, p. 417.

⁹² Danilevsky’s friend and editor of his book on Darwinism, N. N. Strakhov, set out to call the attention of the scientific community to Danilevsky’s book on Darwinism with a provocative article, “Polnoe oproverzhenie darvinizma” (The full refutation of Darwinism) *Russkii vestnik*, Jan. 1887, pp. 9–62. Timiriazev responded with a

public lecture, “Is Darwinism Refuted?” which he later expanded into two long articles, “Oproverzgnut li darvinizm?” *Russkaia mysl* (Russian thought), May 1887, pp. 145–180; June 1887, pp. 1–74.

⁹³ See his *Nauka i demokratiia* as well as the biographical study by G. Platonov, *Kliment Arkadevich Timiriazev* (Moscow, 1955).

⁹⁴ A good example is Darwin’s own response to Rudolph Virchow’s condemnation of Darwinism as socialistic. Darwin found Virchow’s connection between socialism and natural selection foolish (*Life and Letters of Darwin*, Vol. III, p. 237). But Huxley thought that socialism, of which he disapproved, might be a product of natural selection (*Life and Letters of Huxley*, Vol. II, p. 284). About the same time Ernst Haeckel defended Darwinism on the grounds that it was strictly aristocratic in its implications (*Freedom in Science and Teaching*, New York: D. Appleton, 1879, p. 93).

engage in political activity, however limited, could not be duplicated in autocratic Russia, where “all politics was by definition revolutionary.”⁹⁵ The result was that no conservative school of political thought in Russia could even conceive of using Darwinism to rationalize a social structure resting upon an autocracy which found its ultimate justification in divine sanction. The implicit conservative and religious rejection of Darwinism in Russia meant that Darwinism acquired in the particular Russian situation a political context reflecting only the liberal and radical side of the political spectrum. Darwinism became a part of the creed only of those thinkers who considered themselves “progressive” and advanced in their social and political ideas.

S. S. Glagol'ev, an Orthodox theologian, wrote sarcastically that one could hardly mention Darwin's name in Russia in the 1860s without removing one's hat: “To express doubts as to Darwin's scientific competence on any of the questions investigated by him was to deny truth itself. Darwin was proclaimed the most competent, objective, and genius-like of investigators.”⁹⁶ Glagol'ev's observation was more accurate, however, with regard to the Russian radical intelligentsia than to Russian scientists. In revolt against the Russian autocracy and Orthodoxy, Russian radicals sought a “scientific” philosophy to sanction revolutionary goals.

The natural sciences in general, and Darwinism in particular, had become by the 1860s as much a part of revolutionary thought as religion was of Russian conservative thought. The Russian radicals saw in Darwin the Newton of biology. He had unified the various phenomena of organic life into a simple and all-embracing “materialist” law that made possible a consistent philosophical materialism. His theory of natural selection seemed to explain the development of the organic world without recourse to creator or purpose. Russian radicals consequently welcomed Darwin's theory with extraordinary enthusiasm.⁹⁷

The enthusiasm for Darwinism and the natural sciences in the 1860s was not confined to radical thinkers. It was shared by more moderate thinkers who had come to appreciate the significance of the natural sciences for the development of Russia. Their attitude reflected the larger changes taking place within Russia itself. The defeat of Russia in the Crimean War emphasized the need to bring Russia into the modern world. The desire for “scientific” solutions consequently affected also the new men in government occupied with implementing the great reforms of Alexander II.⁹⁸

⁹⁵ Richard Pipes, *Struve, Liberal on the Left, 1870–1905* (Cambridge, Mass.: Harvard University Press, 1970), p. 275.

⁹⁶ As quoted in Kline, “Darwinism and the Russian Orthodox Church,” p. 308.

⁹⁷ With the notable exception of Nikolai Chernyshevsky, who did not express his opposition to Darwinism until 1888, Russian radicals accepted Darwinism with little qualification until the mid-1860s. A controversy at that time over the social implications of the Darwinian “struggle for existence” led the “critical realists” and the socialist revolutionaries (later called populists) to reevaluate Darwinism to meet their ideological presuppositions. The resulting Darwinism was purged of Darwin's metaphorical use of the Malthusian struggle for existence and the Spencerian survival of the fittest. It was expressed

most clearly in the writings of Nikolai Mikhailovsky. See my article “The Russian Populists' Response to Darwin,” pp. 456–468.

⁹⁸ Vucinich, *Science in Russian Culture, 1861–1917*, pp. 3–14. While radicals tended to accept Darwinism and reactionaries to reject it, the response to Darwinism in Tsarist Russia did not follow political divisions alone. There was a notable schism within the radical movement on the social implications of Darwinism, as mentioned in n. 97 above. The extreme right wing of the Russian political spectrum condemned Darwinism without notable exception. The more moderate social thinkers between the extreme left and right did not exhibit any correlation between their views on Darwinism and their given political stance.

Most Russian scientists of the 1860s, with the notable exception of von Baer, shared this enthusiasm for Darwinism; but their attitude was by no means uncritical, as we have seen. The relatively strong interest in biological evolution in Russia in the decades preceding the publication of the *Origin of Species* contributed to their sophisticated attitude toward Darwinism. They accepted Darwinism as the most viable hypothesis of biological evolution, but they did not expect that it would escape later modification. Von Baer's dissenting opinion of Darwinism is significant not merely because it represents his scientific and teleological opposition to the idea of the descent of man. It is significant because it suggests that the scientists in the rising universities and new learned societies were far closer to the social concerns of the generation of the 1860s than were the members of the older Russian Imperial Academy of Sciences, such as von Baer. The new men of science wanted to bring the power of the natural sciences to bear upon the complex problems of a modernizing society frustrated by the archaic political structure of the Russian autocracy. These scientists were in the recently established universities and learned societies rather than in the Academy, and they became the strong advocates of Darwinism within the Russian scientific community in the 1860s and 1870s.⁹⁹

While the interest in Darwinism of some university professors and learned society members was primarily scientific, no one was unaware of the possible social and political implications of Darwinism in Russia. For many specialists, such as Timiriachev, the revolutionary significance of Darwinism within the Russian context was as important as the scientific implication. Such specialists viewed scientific and political progress as inseparably linked. In that interpretation, to be for Darwinism was to be against the Russian autocracy, although the advocacy of Darwinism did not specify the particular type of opposition to the autocracy.¹⁰⁰

Alexander Kovalevsky, whose own life reflected the liberal side of the political spectrum, explained toward the end of the nineteenth century,

Darwin's theory was received with special sympathy in Russia. Whereas in Western Europe it encountered firmly established old traditions which it had first to overcome, in Russia its appearance coincided with the awakening of our society after the Crimean War, so that it immediately acquired citizenship in the scientific as well as in the social world and ever since has enjoyed widespread popularity.¹⁰¹

⁹⁹ That the universities rather than the Academy were the chief centers for the propagation of Darwinism was noted by the secretary of the Academy in 1869 in commenting on the research interests of Academy members. See K. S. Veselovskii, "Otchet Imperatorskoi Akademii nauk po fiziko-matematicheskomu i istoriko-filologicheskomu otdeleniiam za 1869 god" (Report of the Imperial Academy of Sciences for the Physics-Mathematical and History-Philological Departments for 1869), *Zapiskii Akademii nauk*

(Notes of the Academy of Sciences), 1870, 17: 1-15.

¹⁰⁰ Cf., e.g., Timiriachev's "Razvitie estestvoznaniia v 60-e gody" (The development of the natural sciences in the 1860s), *Sochineniia* (Works), 10 vols. (Moscow, 1937-1940), Vol. VIII, p. 175, with his later *Nauka i demokratiia*, published originally in Moscow in 1920, just before his death.

¹⁰¹ Platonov, *Timiriachev*, p. 124.