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## Landscape Science: A Russian Geographical Tradition

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The greatest and highest charm of natural history—the kernel of natural philosophy [consists in the] existence of an eternal genetic and ever orderly connection between the vegetable, animal and mineral kingdoms on the one hand, and man, his life and even his spiritual world on the other.

—V. V. Dokuchaev 1898 (quoted in [Glinka 1927a](#))

In recent decades the English-language literature of both human and physical geography has shown a continuing, if not increasing, fascination with the concept of “landscape” (see, e.g., [Cosgrove 1984](#); [Cosgrove and Daniels 1988](#); [Olwig 1996](#); [Schein 1997](#); [Muir 1998](#); [Arntz 1999](#); [Antrop 2000](#); [Spedding 2003](#); [Winchester, Kong and Dunn 2003](#); [Morin 2004](#)). The role of this ambiguous term in geography has been considered from many angles, and it is clear that scholars differ greatly in the ways they understand it. So far, however, although there has been some discussion of the origins of the term “landscape” ([Olwig 1996](#), 630-31; [Arntz 1999](#); [Tyutyunnik 2004](#)), the English-language literature has paid relatively little attention to its use by geographers in the non-English-speaking world.<sup>1</sup> This article will begin to address that gap by examining the history of *landshaftovedenie* or landscape science in Russia.<sup>2</sup> Since the early twentieth century, and more particularly since the 1950s, landscape science has played an important role in Russian physical geography, occasionally aspiring to cross the physical-human divide. Together with what is sometimes termed “general physical geography,” landscape science constitutes the essence of what some have claimed to recognize as a distinctive Russian “national school” of geography, with an approach to the study of the natural environment that [James and Martin \(1981, 232\)](#) have characterized as “typically Russian.”

The article has three principal objectives. The first is to consider the essence of landscape science in Russia and to examine the relationship between the understandings of “landscape” and “landscape geography” that are enshrined in that approach and those that are emphasized in the Western literature on landscape. The point is made that, whereas the concept of landscape in the English-speaking world has typically focused on landscapes as molded by humanity or as understood, perceived, and represented in different ways, the Russian approach has generally emphasized landscape's biophysical characteristics and its potential for utilization or transformation by humanity. At the same time it is argued that such differences are not absolute, with a strong biophysical emphasis underpinning many parts of the Anglophone tradition, and a “cultural landscape” theme frequently emerging in the Russian one. It is thus a case of contested notions of landscape, and indeed contested ideas of the relationship between human society and nature (see [Turner 2002](#)), to be found within as well as between traditions. The article therefore aims to make a contribution to the ongoing geographical debate on the nature of landscape (see, e.g., [Price and Lewis 1993](#); [Olwig](#)

[1996](#); [Schein 1997](#); [Muir 1998](#); [Arntz 1999](#); [Mitchell 2002](#); [Winchester, Kong, and Dunn 2003](#); [Morin 2004](#)).

The article's second objective is to enquire into the origins of landscape science in Russia as a means of explaining its distinctive features, relating those origins not only to scientific traditions that are native to Russia but also to European (and especially German) geographical thought in the late nineteenth and early twentieth centuries. The point is to show that Russian, English-speaking, and also European conceptions of landscape can be traced back to nineteenth-century German geography, but that subsequently differences arose partly as a result of different scientific traditions, partly in consequence of the influence of key individuals, and partly as the product of circumstances and events in different parts of the world. This therefore provides an illustration of [Shapin's \(1995, 1998\)](#) point that what he calls "local patterns of training and socialization," as well as many other influences, may affect how science develops in specific places. As [Livingstone \(2003, 12\)](#) writes: "Science is concerned with both ideas and institutions, with theories and practices, with principles and performances. All of these have spatial dimensions." The article aims to contribute to the growing literature of the "geographies of scientific knowledge" as reflected in the work of [Livingstone \(1995,; 2003\)](#), [Demeritt \(1996\)](#), [Shapin \(1998\)](#), [Barnes \(2004\)](#), [Livingstone and Withers \(2005\)](#), and others. The article's third objective is to consider whether, and how far, the different concepts of landscape may now begin to inform one another, particularly in the light of current global concerns about environmental sustainability. It is argued that, despite the varied emphases placed on landscape in Russia and also in the West, and despite the differing weights placed on the natural environment more generally, an "ecological" perspective has endured in both cases and has much to contribute to debates about sustainability ([Kates et al. 2001](#); [Perekhod 2002](#); [Huggett and Perkins 2004](#), 225-26; [Potschin and Haines-Young 2006](#)). More recently several writers have argued the need for English-speaking and "continental" (German/Dutch) concepts of landscape to move closer together ([Huggett and Perkins 2004](#); [Head 2004](#); [Spedding 2003](#); [Neumann 2005](#)), but so far the discussion has contained very little reference to Russia, despite the latter country's long-established tradition in this area.

### **The Character of Russian Landscape Science**

Widely acknowledged as the founder of the Russian landscape science tradition, or at least of the geographical expression of that tradition, is Lev Semenovich Berg (1876-1950), professor of the Geography Faculty at Leningrad (St Petersburg) University, president of the Geographical Society of the USSR (1940-1950), and a full member of the Soviet Academy of Sciences from 1946. In the introduction to the third edition of his seminal work, *Geographical Zones of the Soviet Union*, published in 1947, Berg spells out his understanding of the term "geographical landscape" and of its place in geography ([Berg 1947](#), 5-7). He writes that in geography the term "geographical landscape" refers to "the basic unit of our science, the direct object of its study, the geographical individual or particular." Rejecting Albrecht Penck's definition of geographical landscape denoting an area

displaying common relief features, which had passed into the Russian geomorphological and geographical literature from the German, Berg argues for a broader definition. Landscapes, he asserts, are “law-governed, repetitive groupings not only of forms of relief, but also of other objects and phenomena at the earth's surface.” “A geographical landscape,” he continues, “is that combination or grouping of objects and phenomena in which the peculiarities of relief, climate, water, soil, vegetation, and fauna, and to a certain degree human activity, blend into a single harmonious whole, typically repeated over the extent of the given zone of the earth” (Berg 1947, 5).<sup>3</sup>

A landscape, according to Berg, is therefore a naturally interconnected grouping of inorganic and organic features in which change occurring in one feature leads to change in all other features. By way of example, he cites the plowing up of the steppe, which not only disturbs the soil cover and destroys the natural vegetation but also affects the groundwater regime, the nature of the snow cover, the microclimate, processes of erosion, and, ultimately, the relief. The task of the geographer, he believes, is “to understand the mechanics of the intricate complex which we call a landscape” (Berg 1947, 6). Other specialized sciences study “only separate bits of this complex knot of interrelationships, individual bricks in the building, but geography must understand and explain the structure and mechanics of landscape” (6). Further on he explains that landscapes (examples of which might include fir forests on the lowlands of the forest zone, pine forests in the same zone, the Valdai uplands in central European Russia, or the Central Siberian plateau) can be grouped into landscape zones<sup>4</sup> in association with major climatic, soil and vegetation belts (e.g., the tundra, the coniferous forest belt, the steppe, mountains of the desert zone). Equally, landscapes can themselves be subdivided into “geographical individuals” (the smallest meaningful geographical units). Thus the temperate deserts form a landscape zone, sands within these deserts constitute a geographical landscape of the first rank, whereas hillocky sands form a geographical landscape of the second rank, or geographical individual. Some ambiguities are apparent in this classification, and these will be discussed later.

Berg was evidently concerned to establish geography as a separate, scientific field with its own particular object of study. He thus rejected traditional attempts, dating back to Varenius and before, to divide the subject into general geography (*zemlevedenie*) concerned with the study of the earth as a whole and special geography (*stranovedenie*), directed at the study of countries or regions. For Berg, only special geography constituted the essence of geography, but as a scientific pursuit it had to be based on the study of natural units rather than artificial ones—in other words, on landscapes and zones. He described his view as a more precise approach to *stranovedenie*. Furthermore, he distinguished between geography and physical geography. The latter, he argued, is concerned with general processes and their resulting forms (“the physics of the earth”) and can be subdivided into its various systematic specialisms: meteorology, hydrology, and so on. According to Berg, the geographer needs to be trained in physical geography, but the two are distinct disciplines (Berg 1947, 10; 1956, 142).

Because for Berg landscape science is geography, he had no need to define it as landscape science (*landshaftovedenie*). The 1947 edition of his book came toward the end of a long and distinguished

career, by which time he had many followers. However, even during his lifetime some of his ideas (e.g., his contention that geography and *landshaftovedenie* are one and the same) were by no means universally accepted in the USSR, and this point will be returned to below. Nevertheless, Berg's essential understanding of landscape—that a landscape is a natural unit displaying a high degree of interdependence between relief, climate, hydrology, soils, flora, fauna, and even to some degree human activity—forms the core of the landscape science tradition in Russia to this day.

### **Russian Landscape Science and Western Conceptions of Landscape**

Berg had had the usual broad scientific training that was typical of Russian geographers in the late nineteenth century (see [O postanovke 1887](#); [Isachenko 2000](#)), but from 1916 he began to teach geography at university level in St Petersburg and from that point his career was firmly tied to geography. It was as a result of his early prominence that Berg was able to ensure that his concept of landscape gained acceptance among Russian geographers and eventually, after many vicissitudes, that landscape science secured a significant place in the discipline.

It will already be evident to many readers that both the place of landscape science in Russian geography and the concept of landscape it embraces are somewhat different from those common in the English-speaking world. As is well known, in the United States it was largely through the influence of the Berkeley geographer Carl Sauer that the concept of landscape gained significance in the discipline ([Sauer 1963](#)). Sauer reacted against the environmental determinism that was so fashionable among U.S. geographers in the 1920s and 1930s and constructed a notion of “cultural landscape” (with a biophysical basis) that was to form a core idea of the Berkeley school of cultural geography ([Livingstone 1992](#), 260-62, 294-302). In the thinking of Sauer and his school, the cultural landscape is the physical expression on the earth's surface of human interaction with nature, molding what had previously been a “natural” landscape (though, as more recent studies have shown, few if any of the earth's landscapes can now be said to be truly “natural”) into one more shaped to human needs. For the Berkeley school, unlike for Berg and the Russians, human beings and their activities were thus of key concern in the study of landscapes. In the United Kingdom, where Sauer's direct influence was limited, a humanistic approach to the landscape idea also gained prominence, largely through the historical geographies of landscape expounded by historians including W. G. [Hoskins \(1955\)](#) and geographers including Clifford Darby (see [Coppock et al. 2002](#)).

The different emphases placed by Russian and Anglo-American geographers on landscape hardly diminished through time. In the United States the Sauerian approach to cultural landscapes (though variously interpreted) continued to attract followers, particularly in the study of vernacular landscapes ([Meinig 1979](#); [Jackson 1984](#)). But the landscape concept was also heavily criticized because of the inherent ambiguity of the term *landscape* (see [Hartshorne 1939](#), 149-74, [250-84](#); [1959](#), 48-64). More recently, the Berkeley approach to cultural geography has been attacked on the grounds of its supposed “superorganic” understanding of culture, according to which culture is reified into an unproblematic entity through which landscapes are molded by human agency ([Duncan 1980](#); but see

also [Price and Lewis 1993](#)). There followed what [Olwig \(1996, 630\)](#) terms a widespread “disciplinary dematerialization” of landscape in the work of many English-speaking geographers, whereby landscape began to be regarded less as an entity existing in the physical world than as a metaphor, text, image, or scene ([Cosgrove 1984](#); [Cosgrove and Daniels 1988](#); [Neumann 2005](#), 157-59). This “cultural” or “representational turn” led to a wide diversification of landscape studies ([Head 2004](#); [Huggett and Perkins 2004](#)).

It is worth pointing out that, however strident some of the attacks made on the Berkeley school, the idea of landscape as a real material entity has endured in the Anglo-American world (see, e.g., [Olwig 1996](#); [Muir 1998](#); [Arntz 1999](#); [Head 2004](#)). Sauer himself, of course, being well versed in the German geographical tradition, was keenly aware of landscape's biophysical aspects. Indeed, in his classic essay of 1925, “The Morphology of Landscape,” Sauer dwelt at length on the biophysical character of landscape, relating it carefully to landscape's cultural features ([Sauer 1963](#), 330-43).<sup>5</sup> As shall become clear in a later section of this article, this German tradition was also influential for Berg and other Russian geographers. In his essay Sauer cites the work of the German geographer Siegfried Passarge who was one of the founders of landscape geography in Germany (see [Passarge 1919, 1929](#); [Sauer 1963](#), 324, 331-37). Passarge had argued that landscape should be seen as a central device for the systematic organization of both physical and human data gathered in an area for scientific analysis. Sauer used Passarge's approach as the basis of his geographical method, which he termed a “morphology of landscape.”<sup>6</sup> For Sauer, then, landscape's biophysical character can never be ignored or minimized, even though it was human society that was central to his concern.<sup>7</sup>

It has been argued that it was Sauer's interest in landscape's biophysical character, together with his concern about mankind's growing impact on the environment, that eventually provided an impetus for the rise of cultural ecology ([Denevan 1983](#); [Butzer 1989, 1990](#); [Turner 1989, 2002](#); [Price and Lewis 1993](#); [Zimmerer 1994, 1996](#)). Several scholars have noted that although Sauer did not specifically embrace the term “ecology” to describe his studies ([Leighly 1987](#); [Zimmerer 1996](#)) he can fairly be said to be one of the originators of the cultural-ecological tradition. As [Turner \(2002, 68, n. 35\)](#) has argued, cultural ecology “represented the maintenance of Sauerian landscape (including historical) interests, refocused within a science-friendly template.” The emphasis for many of these studies has been on non-Western societies viewed at small to medium scales. In Turner's view, however, the impact of this and related human-environment approaches in geography at large has been limited (in the United States at least) by the overall hegemony of what he terms the “spatial-chorological” paradigm ([Turner 2002](#), 55-56).

Meanwhile a somewhat parallel development to the development of cultural ecology occurred in Germany. Here a major contribution to landscape geography had been made by Carl Troll before the Second World War, building on a tradition that dated back to Alexander von Humboldt and which he began to describe as “landscape ecology” ([Troll 1950, 1966, 1971](#)). In this conception, landscape ecology, which particularly focused on European landscapes, embraced the study of both human activity and natural features and processes and was scientific and applied in approach, regarding climate and biological processes as central to the study of physical geography ([Paffen 1955](#); [Uhlig](#)

[1973](#)). Although this approach to geography continued with some vicissitudes in West Germany after 1945, an analogous landscape science also developed in Soviet-dominated East Germany, clearly influenced by the Russian geographers (see, e.g., [Neef 1967](#), [1983](#)). Similar developments occurred elsewhere behind the Iron Curtain. However, in the English-speaking world, European landscape ecology had long had limited appeal, remaining divorced from approaches like cultural ecology with their emphasis on non-Western societies. One reason may have been landscape ecology's strong links with physical geography. After the 1950s a more rigorous and quantitative physical geography in the English-speaking world moved the emphasis away from holistic concepts like landscape (despite the evident interest in systems theories) toward the systematic study of processes ([Spedding 2003](#), 292-94).

More recently, however, landscape-ecological approaches appear to have been having a wider impact in the West more generally ([Spedding 2003](#); [Huggett and Perkins 2004](#)). It has been argued that it was in the Netherlands in the 1970s that there arose a fresh interdisciplinary approach to landscape ecology as a response to growing concerns about the state of the environment ([Antrop 2000](#); [Huggett and Perkins 2004](#)). This approach to landscape embraces natural, ecological, cultural, and social issues, and has been inspired among other things by the availability of new technologies like remote sensing and geographic information systems. It seems likely to have an important impact on English-speaking geography ([Gregory 2000](#), 171ff.; [Huggett and Cheesman 2002](#)). Hence, after several decades during which European and English-speaking geographies of landscape have not always been close,<sup>8</sup> the stage may now be set for a *rapprochement*. How far the long-established Russian approach to the study of landscape can contribute to that *rapprochement* is an issue addressed in the latter part of this article.

### **Landscape Science as Russian Tradition: The Environmental School of V. V. Dokuchaev**

Thus far it has been argued that the landscape idea in geography differs in different parts of the world. The article's second objective is to consider why this is so, focusing on the Russian case in particular. The "geography of scientific knowledge" literature cited above argues that different traditions, conceptualizations, and practices in geography have arisen in different parts of the world as a result of variant factors both external and internal to the discipline. One factor that can be argued to have been significant in the development of Russian landscape science was the existence of Russia's own tradition in the environmental sciences. It is this factor that will now be considered.

In a footnote on page 147 of his seminal work cited above, Berg asserts: "I developed my conceptions of geographical (landscape) zones independently, though on the basis of Dokuchaev's soil science" ([Berg 1947](#)). The reference is to the eminent Russian soil scientist, Vasilii Vasilievich Dokuchaev (1846-1903), thus providing an impeccably Russian pedigree for Berg's work at a time when undue reliance on "bourgeois" foreign authorities was being regarded with growing suspicion by the Soviet government ([Hosking 1992](#), 306-16; [Keep 1995](#), 9-38; [Krementsov 1997](#)). Reference back to the work

of Dokuchaev as a source for their own is a practice that has been carefully maintained by most Russian landscape scientists and physical geographers ever since (see, e.g., [Isachenko 2004](#)). Dokuchaev had initially trained as a geologist but then gradually moved via quaternary geology, geomorphology, and hydrology into the study of soils in association with a range of academic and official organizations. Eventually his classic monograph, *The Russian Black Earth* (1883; [Dokuchaev 1952](#)), earned him a doctorate in mineralogy and geology. Subsequent scientific expeditions to Nizhnii Novgorod (1882-1886) and Poltava (1888-1896) provinces extended this work, particularly in a complex direction in which all components of terrestrial nature (geology, local climate, soils, hydrology, flora, and fauna) were analyzed in an interlinked way as a basis for making land evaluations and recommendations for agrarian development. In the 1890s, in connection with the disastrous famine of 1891, Dokuchaev headed the Special Expedition of the government's Forestry Department, which involved a complex investigation of methods for combating drought and soil erosion in the steppe zone and for improving and regulating agriculture, forestry and water use. Such work provided a foundation for a distinctive Russian tradition in the environmental sciences. Five characteristics of Dokuchaev's work were to have far-reaching consequences for the subsequent conduct of landscape science in Russia ([Glinka 1927b](#), [1927d](#); [Sobolev 1961](#)). First, Dokuchaev emphasized soil as a key component that interconnects inorganic and organic nature in such a way that no one component can be understood in isolation from others. Second, and this reflects the late-nineteenth century influence on science of Darwin and the theory of evolution, Dokuchaev argued that terrestrial nature must be understood dynamically as a product of past and present processes that act to change its components in interlinked ways and that must be expected to continue to do so in the future. Third, his approach strongly emphasized the importance of field investigations, often requiring making observations and collecting diverse kinds of data over the long term. Fourth, Dokuchaev's studies almost always had a pronounced applied character, focused on the solutions to key environmental problems. Finally, his genetic soil classification scheme had a spatial or zonal form, according to which it was recognized that the major types of soil, and with them other key natural components, tend to vary in accordance with past and present climatic processes. Across Eurasia this means that the major soil belts succeed one another along the line of the meridian. Although the zonal character of soils was recognized by Dokuchaev in his early studies of the black earths, it was only toward the end of his life that he began to speak of global "natural zones" in the broadest sense<sup>9</sup> ([Dokuchaev 1949a](#), [1949c](#)). This insight was subsequently carried forward by his pupils. Dokuchaev's early death robbed science of a gifted and charismatic leader. Fortunately, however, he had numerous students and followers to continue his work, and these were also to be influential for landscape science. One of the most well known was K. D. Glinka (1867-1927). In many ways Glinka established soil science on an official basis, founding the Dokuchaev Soil Committee in 1911 and the Soil Institute in 1927. His major 1908 work on zonal soils was translated into German in 1914, from which edition it was translated into English and published in the United States by C. F. Marbut in 1927 ([Glinka 1927c](#)). In this way the work of Dokuchaev and his school first entered the consciousness of the English-speaking world. V. I. Vernadskii (1863-1945), who had been supervised as a student by



Dokuchaev in St Petersburg, became internationally known for his work in mineralogy and crystallography and particularly for his foundational work in geochemistry and biogeochemistry. His development of the concepts of biosphere and noosphere were to have a major impact on numerous branches of environmental science in Russia ([Vernadskii 1998](#); [Oldfield and Shaw 2006b](#)). Others who made important contributions to landscape science included G. N. Vysotskii, G. F. Morozov, and R. I. Abolin. Two who went on to become professional geographers were A. N. Krasnov, who headed the geography department (*kafedra*) at Khar'kov University from 1889, and G. N. Tanfil'ev, who occupied the analogous position in Odessa from 1905.

It is probably true to say that what most impressed Berg about Dokuchaev's scientific studies was what Glinka referred to as his teaching on the *geographicity* of soils—in other words, that soils vary not primarily according to their underlying bedrock (which is azonal, being subject to no geographical law) but according to their geographical position or zone, reflecting the influence of climate (as well as microclimate and thus topography) and vegetation ([Glinka 1927b](#), 1-6). Dokuchaev advanced the view that soils should be seen as an independent natural body, evolving in accordance with known processes and thus to be distinguished from mere loose sediments at the earth's surface. He was also conscious of the close links between the geography of soils, geobotany, and zoogeography, thus perceiving “the grand synthesis of natural science, which is lately finding expression in the theory of 'geographical landscapes'” ([Glinka 1927b](#), 16). Dokuchaev's pupil, G. F. Morozov, the specialist on forest ecology, fully accorded with Berg's view when he wrote of soils in 1916 that “it seems to me that no other body or phenomenon in Nature could so obviously establish the importance of the geographical synthesis” (quoted by [Glinka 1927b](#), 18).

In citing the work of Dokuchaev and his school, Berg was thus harking back to a scientific tradition that was not only personified by the great soil scientist, whose work was widely acclaimed within Russia and increasingly across the globe, but one that could also be claimed to be undeniably Russian.<sup>10</sup> Berg had first formulated his concept of geographical landscape in publications of 1913 and 1915, which indicate that he knew of the work of various members of the Dokuchaev school, including Tanfil'ev and Glinka ([Berg 1913](#), [1915](#)). Strangely enough, he later admitted that he had only become aware of Dokuchaev's late work on “natural zones” (which was published in rather obscure outlets) when he read Glinka's discussion, published in 1927 ([Berg 1956](#), 144, 147; [Glinka 1927a](#)). Berg's concept of landscape thus seems to have been influenced by the Dokuchaev school in a general way, but it was only later that he realized that Dokuchaev himself had written about global “natural zones” (what Berg termed “landscape zones”), or biomes.

### **Landscape Science as Russian Tradition: *Landshaftovedenie* and *Landschaftskunde***

Berg's citing of the work of Dokuchaev as the basis of his own is both understandable and logical, but also contains an irony. Berg was very much a geographer, whereas Dokuchaev refused to identify with the subject in any way. Indeed, in calling for a new synthetic science that would integrate studies of components of the natural environment and society, Dokuchaev had stated that this new science

could not coincide “with geography, which is spreading in every direction” ([Dokuchaev 1949b](#), 331). Geology, soil science, botany, zoology, and forestry were what Dokuchaev and most of his followers identified with—in other words, essentially physical sciences. Geography, whose establishment in Russian universities had been decreed by the government in 1884 following the precedent set by the Germans ten years before, was a distinctly eclectic discipline that appeared to suffer an identity crisis from the moment of its inception. Dokuchaev seems to have seen little future for it. Berg's view was quite different, and we would argue that his view was crucial to the development of Russian landscape science.

Berg had studied zoology and geography at Moscow University and then worked for several years in Central Asia where he conducted scientific research into a wide range of problems in physical geography. His prime specialism was ichthyology but he also worked on problems of climatic change, limnology, hydrology, physiography, and related areas. His first major publication, a physical geography of Central Asia, appeared in 1908 and the related dissertation won him the degree of doctor of sciences in 1909. From 1904 Berg commenced work at the Zoological Museum in St Petersburg and eventually began teaching physical geography at St Petersburg University in 1916. He was to remain there as geography professor for much of the rest of his life.

Berg was extraordinary in the breadth of his scientific interests, drawing on a range of specialisms in the natural sciences but also on the ideas of geographers. As a naturalist, and like Dokuchaev, he was much influenced by von Humboldt, but as a geographer (and here he resembled other Russian and German geographers but not Dokuchaev and his school) he was also affected by the thought of Karl Ritter with the latter's accent on human, historical, and physical geography. Another and more immediate German influence on Berg was the major geographical philosopher and methodologist Alfred Hettner (1859-1941), whose ideas were, of course, also significant for Sauer (e.g., see [Sauer 1963](#), 317-21). For Berg and other Russian geographers, Hettner's great contribution to their discipline was to endow it with a unique object of study: the place or region ([Hettner 1905](#), [1927](#); [1930](#)). Hettner argued that space and place are to the geographer what time is to the historian; in other words, geography is a chorological<sup>11</sup> science just as history is a chronological one: “geography can be an independent science only as chorology; that is, as knowledge of the varying expression of the different parts of the earth's surface” (Hettner, quoted in [Sauer 1963](#), 317). In his publications of 1913 and 1915, Berg argues that his concept of landscape fully accords with Hettner's teachings on geography as a chorological science. The same emphasis is to be found in his later book on the history of geography in Russia ([Berg 1929](#)) and in all of his seminal work on landscape zones ([Berg 1930](#), [1931](#), [1937](#); [1947](#)).

It can be argued, then, that in formulating his concept of geographical landscape in the years before 1913-1915, Berg had been influenced by the Dokuchaev school and in particular by the latter's emphasis on the mutual interrelationships between natural phenomena as reflected in spatial patterns on the earth's surface. His detailed development of the landscape concept took place, initially at least, in ignorance of the fact that Dokuchaev himself had extended his notion of the geographical zonation of soils and related phenomena into an outline theory of global natural zones. Berg's specific

contribution was to argue for the existence of geographical landscapes at a number of scales, of which the geographical or landscape zone (Dokuchaev's natural zone) was the biggest. At the same time he was also clearly impressed by Hettner's definition of geography as a chorological science as a way of ensuring that geography was endowed with its own unique object of study—the place, region, or landscape. Hettner had argued that the geographer studies those phenomena that are interlinked and arise as a result of their specific locations on the earth's surface ([Hettner 1930](#), 115ff.). However, whereas Hettner often seemed vague about exactly what kinds of interrelationships between phenomena in geographical space should be regarded as the essence of geographical study,<sup>12</sup> Berg, following the Dokuchaev school, saw the interrelationships between natural phenomena as key. Thus Berg attempted to marry the scientific insights of the Dokuchaev school with the prevailing concepts of German geography.<sup>13</sup>

The Russian word *landshaft* derives from the German word *Landschaft*, and is identical in meaning. Use of the latter by German natural scientists dates back to the days of von Humboldt, and later the term was adopted for academic use by geographers including Ritter, Ratzel, Schüller, and Hettner himself ([Arntz 1999](#), 297). It is possible that Russian geographers took the notion of *Landschaft* from the pages of von [Humboldt's \(1849\) \*Cosmos\*](#), but more likely directly from the German geographers since a number of the Russians before 1914 trained in Germany. The term was certainly well known in Russian geographical circles before the appearance of Berg's work on landscapes (e.g., see [Anuchin 1912](#)). Berg's adoption of the term for his biophysical units was therefore fully in keeping with Russian geographical usages at the time. Interestingly enough, it was only subsequent to the publication of Berg's early work on landscapes that nongeographers of the Dokuchaev school adopted the term, as reflected in Glinka's reference to Berg's "theory of geographical landscapes" (see [Glinka 1927b](#), 16; [Dronin 1999](#), 68).

For Berg (and indeed for Sauer), one further significant German scholar was the aforementioned Siegfried Passarge, who worked at the Kolonial Institut in Hamburg and who was one of the founders of German landscape geography (*Landschaftskunde*). Passarge's work on landscapes dated back to an article on Africa published in 1908 in which he argued that the main purpose of the geographical discussion of such a huge continent was the analysis of biophysical landscapes ([Passarge 1908](#), 266). Five years later a second article defined the field of landscape geography, based on the study of biophysical landscapes ([Passarge 1913](#)). In subsequent work Passarge further developed his ideas on landscape types and classification and attempted a major regionalization of the world in which differences in natural vegetation loomed large ([Passarge 1921](#), [1929](#)).

Passarge's ideas clearly bore much similarity to those of Berg and other Russians, and in his book on *Geographical Zones* Berg states that "latterly the study of geographical landscapes has been developed simultaneously—in Germany by the Hamburg geographer Passarge, and among us by the author of the present work—on the basis of Dokuchaev's soil science and of studies of plant biocenoses undertaken by Russian botanists" ([Berg 1947](#), 7).<sup>14</sup> Passarge's studies eventually helped foster the German landscape ecology tradition discussed earlier, but appear to have more or less paralleled those of Berg.

## **Landscape Science as Russian Tradition: Cultural, Political, and Ideological Influences**

The foregoing survey has argued that Russian landscape science can be traced back to Russian traditions in environmental science dating from Dokuchaev, but that it was given its principal focus in landscape by the geographer Lev Berg, strongly influenced by the German geographical school. But to explain the distinctive features of Russian landscape science, it is also necessary to discuss a number of cultural, political, and ideological factors that were influential in the development of Russian science from the second half of the nineteenth century and through much of the twentieth.

One significant cultural feature was the high status of science in Russia. As has been seen, Berg (and many influential geographers of the period; see [Turner 2002](#)) was concerned with establishing geography on a solid scientific basis, and indeed Berg criticized Hettner for partly basing his notion of regions on such artificial units as states rather than on scientifically-delineated landscapes ([Berg 1915, 10](#)). Berg himself was essentially a physical geographer and zoologist, as we have seen, and it no doubt seemed natural to him to base his landscape science on the environmental traditions of the Dokuchaev school. The latter were built upon a long history of exploration, natural history, and (eventually) scientific survey with a strongly applied orientation toward national development, a history that can in fact be traced back to the era of Peter the Great ([Shaw 1996](#)). A particular feature of this scientific tradition was its broad, interdisciplinary character (focused particularly on the physical sciences). The latter was reflected both in the nature of the Russian Geographical Society, founded in 1845, and in the way geography developed as a university discipline, with a strongly scientific emphasis, from the 1880s ([O. postanovke 1887](#)). Perhaps because it came relatively late to Russia, science enjoyed enormous prestige and the practically-oriented field and applied sciences were felt to be particularly relevant to national needs. The words of the historian Nikolai Krementsov, writing of the Stalin period, could in fact be applied to practically the whole of the period of this study: "The notion that scientific research would yield practical benefits, and indeed was the motive force of human progress, was central to the belief system of Russian scientists" ([Krementsov 1997, 15](#)). In this context it was understandable that the focus of scientists in the environmental field (of whom there were relatively few) tended to be upon the analysis, management, exploitation, and, where necessary, transformation of geographical environments.

The orientation of Russian science in this period can also be related to the country's international situation. From the time of Peter the Great (reigned 1682-1725) and more particularly from the Crimean War (1853-1856), Russians had become conscious of their country's economic and social underdevelopment relative to the rapidly advancing West European states. Russia was now a great empire and aspired to become a great power able to compete with the other great powers on equal terms. The Emancipation of the Serfs (1861) sparked off a period of reforms and fitful modernization that became more concerted with the onset of the industrial revolution in the 1880s. Dokuchaev's scientific surveys, Berg's early work in the fields of hydrology and ichthyology, and the foundation of university geography formed a small but significant part of a nationally-oriented scientific and

modernizing endeavor in which the felt need was for geographical information, the solution of environmental problems, and economic development more generally (see, e.g., [Anuchin 1949](#)). Of course, one must not exaggerate the tsarist government's consistency in such matters, or its alacrity in contemplating widespread reform. And the specifically environmental sciences were not always regarded as a high priority. But the establishment of the Council for the Study of Productive Forces (KEPS) in the wartime conditions of 1915, with a brief to study the country's endowment of natural and productive resources, can be regarded as a high point in the influence of applied environmental sciences under the tsars. With V. I. Vernadsky as chair and Lev Berg as member, and run under the ambit of the Academy of Sciences, the Council's success arguably helped persuade the new Soviet government that took power in 1917 to prolong the existence of the Academy of Sciences into the new era ([Krementsov 1997](#), 20).

The applied orientation of Russian science, including the environmental sciences, was only strengthened during the Soviet period. Particularly from the late 1920s, as a result of Stalin's economic and social revolution, Soviet science was "nationalized" and all its resources were called on to aid in the great campaign of industrialization and militarization. The country's first specialized geographical institution, the Geographical Institute, was established in 1918, universities and other educational bodies were required to increase their output of geography teachers, and a specialized Institute of Geography of the Academy of Sciences, an outgrowth of KEPS, appeared by 1937, devoted to applied research of various kinds. In these circumstances Berg and other geographers were also required to orient their research toward national needs.

It is an indication of Soviet priorities in resource development and industrialization, in the context of a vast territory much of which was hardly surveyed or inventoried at the time, that by now geography was clearly dominated by its physical branches<sup>15</sup> ([Isachenko 1971](#)). National goals demanded that landscapes be viewed primarily as biophysical rather than cultural phenomena. But this is not to suggest that there was no traditional Russian interest in cultural landscapes. For example, as we have seen, toward the end of his life Dokuchaev had spoken of the "law of global zonation" according to which the natural zones girdling the earth reflect not only the geographies of a range of interrelated natural phenomena but also human living conditions, activities, and even spiritual beliefs (his examples are drawn mainly from less-developed parts of the globe). However, it is clear that his thinking on human-environmental interrelationships was extremely undeveloped, bordering on crude determinism ([Dokuchaev 1949a](#), 318-19; 1949c, 325-26). More sophisticated was the thought of Berg who, in his 1930 book on *Landscape-Geographical Zones of the USSR* ([Berg 1930](#), [1931](#)), examined the ways in which patterns of human settlement, activity, and many traditions reflect environmental constraints and opportunities in each of his geographical zones (Berg had introduced the concept of "cultural landscape" to Russian geographers in his article of 1915). He also gave much detail on ethnic structure and on how customs, ways of life, and particularly material culture are adapted to the environment. There is therefore not a little of Vidal de la Blache's *genres de vie* in Berg's approach (see [Buttimer 1971](#), 53). Yet another geographer whose approach to the study of landscapes attempted to incorporate the human dimension was V. P. [Semenov-Tyan-Shanskii](#) (1870-1942),

particularly in his book *Region and Country*, published in 1928. In this work he insisted that the study of landscape should concern itself not merely with the latter's biophysical characteristics but also with its visual, aesthetic, and cultural dimensions. Geography, according to Semenov, was close to art—studying landscape as *paysage* and fostering a sensitivity to the colors, sounds, and smells of landscape, to the ways in which it changes with the seasons, to its beauties and how they are reflected in the work of the painter, sculptor, novelist, and poet. In certain respects, therefore, Semenov foreshadowed some of the recent work of Western cultural geographers mentioned earlier. In this of course he was a disciple of Hettner, and ultimately of von Humboldt.

In Stalin's era, however, and in the words of one Russian commentator, “an holistic concept of landscape ... was to a significant degree lost to our science” ([Polyan 1989](#), 91). This was not merely the product of the regime's economic priorities discussed above but also of its ideological prejudices that particularly came to the fore with the onset of Stalin's cultural revolution at the end of the 1920s. According to Marxist-Leninist dogma, the laws governing the physical world and those governing human society are different sets of laws, and any attempt to unite the two in one conceptual scheme, like Berg's landscape science, was bound to attract criticism (aspects of this issue were examined by David [Hooson 1959, 1962](#), and by I. M. [Matley 1966, 1982](#)). As a result of the criticism he received in these years, Berg dropped any discussion of the cultural landscape from subsequent editions of his book ([Berg 1937, 1947](#)). In practice Stalinism engendered the simplest possible understanding of human-environmental interrelationships, serving to distance society from environment and envisaging the domination and manipulation of the latter by the former. Landscape science was also attacked on account of its close association with Hettner, who came to be regarded as a dubious foreign proponent of anti-Marxist philosophy. And it was attacked because of its alleged conservatism, having a supposed obsession with such matters as regionalization and a nostalgic attitude to past landscapes rather than being concerned with their transformation. These attacks were especially embodied in the writings of the politically powerful Director of the Academy of Sciences Institute of Geography, A. A. Grigor'ev, who remained an important enemy of landscape science down to his death and advocated its replacement by “general physical geography” ([Zabelin 1989](#)). Only after Stalin's death in 1953 did it come to be accepted that both landscape science and Grigor'ev's approach had a place in Soviet geography, and landscape scientists were permitted to hold regular conventions (from 1955).

Yet the study of landscapes as purely biophysical phenomena, and the view of landscape science as a branch of physical geography only, was an obvious weakness in the Soviet approach to landscape and one which did scant justice to the earlier Russian tradition. In the Stalin era much effort was put (and is still being put) into field studies and surveys, the compilation of landscape maps at many different scales and of different kinds, and the monitoring of landscapes. But doubts about this narrow orientation gradually surfaced, particularly from the 1970s when the negative effects of the Stalinist environmental record began to attract attention and criticism. There followed a partial “ecologization” of landscape science, as reflected, for example, in F. N. Mil'kov's work on “anthropogenic landscapes” (1973, 1997) and the attempts to develop a new science of “geoecology” ([S. P. Gorshkov 2001](#)). Furthermore, new questions about the development and management of cultural landscapes,

including aesthetic and ethical issues, emerged from the theoretical and applied work on landscapes that was called forth by a more urbanized and demanding society, for example the Institute of Geography's work on recreational landscapes ([Geografiya 1980](#)). For the most part, however, such work continued to be essentially that of the physical geographers and the gap with the social sciences (which were not high priorities during most of the Soviet era; see [Ellman and Kontorovich 1992](#)) was a wide one. Therefore it is hardly surprising that, in the late 1990s, a leading landscape scientist could talk of "acute problems" in the subdiscipline, stemming from its lack of adequate attention to ecological and social issues ([Preobrazhenskii 1998](#)). It is only in the more liberal atmosphere of the post-Soviet era that newer approaches to landscape are gradually being adopted.

Within landscape science itself some of the key problems eventually faced by the landscape scientists derived from Berg's own understanding of landscape. There was, for example, the issue of how far landscapes were to be understood as unique phenomena, the earth's surface being subdivided into discrete natural units that could be easily recognized in the field, or how far they were typological. Berg had talked of landscapes as "typically repeated over the extent of the given zone of the earth" and yet gave both the Valdai Uplands (a unique landscape) and pine forests of the forest zone (typological) as examples of landscapes ([Berg 1947](#), 5-7). Related to this were the obvious difficulties surrounding physical regionalization (unlike Hettner, Berg inclined toward the view that an objective regionalization of landscapes was possible), and the fact that, in the view of most landscape scientists, landscapes existed at a number of different scales, posing difficulties over how the different scales were to be demarcated and what terminology should be employed to denote them. After long tending to think of landscapes as absolute phenomena that might easily be recognized in the field (though differing sharply over what the basis of such recognition might be), most geographers eventually edged toward a relativistic understanding of landscape, incorporating the view that landscapes might exist in a number of different guises, depending on what processes were dominant in their formation. According to N. M. Dronin, this relativistic view of landscape finally achieved dominance at the tenth convention of landscape scientists in 1997 when "geographical reality no longer presented itself to geographers in the form of a singular, organized, deterministic construction, a fact that may be regarded as a major stage in the development of the classical landscape concept in our national physical geography" ([Dronin 1999](#), 199). Such relativistic understanding was no doubt aided by the gradual adoption of new methods in the study of landscapes such as mathematical modeling, systems and ecological approaches, and landscape geochemistry (deriving from Vernadskii's work on biogeochemistry).

### **Landscape Geography: *Ex Pluribus Unum?***

This article's third objective is to ask whether the different approaches to landscape discussed above have anything to say to one another, particularly in light of current concerns about environmental sustainability. The article has argued that neither in Russia nor in the West have geographers found it possible to adopt an agreed-upon perspective on landscape. In both cases the concept of landscape,

and more broadly the question of the relationship between human society and the natural environment, has been contested. At the same time it can be argued that both Russian and Western landscape geographies embrace a discourse about the relationship between society and the physical environment, providing a basis for interaction and collaboration.

The landscape traditions in both Russia and the West are characterized by strengths and weaknesses. In the West, in the opinion of [Turner \(2002\)](#), the significant human-environment discourse in geography has been overshadowed by what he terms the “spatial-chorological” paradigm, as a result of which newer approaches to human-environment interrelations, such as cultural and political ecology, have had limited appeal. The gap between human and physical geography remains a wide one. It is therefore by no means clear how ready geographers are to engage in debates about sustainability.

In Russia the situation is quite different. Russian landscape science is solidly based in physical geography, indeed has traditionally been considered a part of physical geography, and geography as a whole has been dominated by its physical branches (much to its detriment, in the opinion of some). But links with the social sciences are commensurately weak and are only now being addressed. Traditionally, Russian landscape science has adopted a narrow, utilitarian approach. Newer Western approaches to the study of landscape, including cultural and political ecology with their accent on the small and medium scales, are only now becoming known.

Landscape science in Russia is also beset by other problems. The economic difficulties that accompanied the transition from communism have had a devastating impact on science, and money for research (to say nothing of salaries) has been in short supply. Furthermore, ongoing and wide-ranging restructuring of the Russian academic system is undermining the ability of science to develop and maintain meaningful work programs. The cultural barriers must also not be underestimated in their ability to hinder international contacts. The younger generation of Russian geographers are now much more able than their seniors to cope with the English language (now becoming de facto the international language of science). But the reason that so little of their published work is known in the West is because most of it is in Russian and relatively little is translated.<sup>16</sup> There are also problems for Russians who have not lived in the West wishing to publish in Western outlets, given the unfamiliar conventions and the difficulties of writing publishable English.

Perhaps the most significant weakness in Russian landscape science is the neglect of the human dimension in favor of an applied, essentially technocentric, approach. Clearly this is an area that Russian landscape scientists must address to enhance the value of their science to sustainability, building on the traditions of Semenov-Tyan-Shanskii and others. Fortunately there is good evidence that this issue is now being attended to, following on some genuine advances in the late Soviet era. Thus the recent literature on geocology ([S. P. Gorshkov 2001](#)), on the delineation and protection of cultural landscapes ([Vedenin 1997, 2003](#); [Vedenin and Kuleshova 2001](#); [Streletskii 2002](#)), on the aesthetics of landscape ([Nikolaev 2003](#)), and on landscape image and interpretation ([Zamyatin 2004, 188-222](#)) is now helping to broaden the scope of landscape science beyond a narrow Soviet view to embrace issues germane to sustainability (cf. [Huggett and Perkins 2004](#)).



Numerous commentators have argued that it is now time for geographers working in the different traditions of landscape to combine their interests in recognition of the inherent complexity of the landscape concept and of its importance to sustainability—in other words, it is time to collapse the distinction between physical and human geography ([Turner 2002](#); [Head 2004](#); [Huggett and Perkins 2004](#); [Potschin and Haines-Young 2006](#)). There is ample evidence to suggest that the Russian landscape science tradition has much to contribute to an evolving international science of landscapes and indeed to the broader debate about global sustainability (see [Oldfield and Shaw 2006a](#)). Quite apart from the long Russian tradition in classifying, analyzing, evaluating, monitoring, modeling, and mapping landscapes, which still continues, the country has a lively history of philosophical and sociological debate over the significance of landscapes and of the environment more generally (related to the distinctive Russian philosophical tradition), incorporating consideration of the ethical dimensions of which so much has been heard recently in the West ([Margulis et al. 1998](#); [Moiseev 1999](#); and see [Bryant and Jarosz 2004](#)). The work of V. I. Vernadskii and his concepts of biosphere and noosphere, for example, have recently attracted international interest as having both scientific and philosophical relevance to current debates ([Bailes 1990](#); [Smil 2002](#); [Oldfield and Shaw 2006b](#)). In Russia itself, a high-profile section of the academic literature advocates a rigorously scientific approach to sustainability, relating its attainment to the effective functioning of natural physical systems. This approach has obvious affinities with certain Western responses to the sustainable development issue that place emphasis on understanding the earth's biophysical systems (e.g., see [Clark and Munn 1986](#); [Oldroyd 1996](#), 283-305; [Kates et al. 2001](#); [Schellnhuber, Crutzen, and Clark 2004](#)). The concept of biotic regulation, for example, forms an important feature of contemporary Russian understanding of the biosphere (e.g., see [V. G. Gorshkov 1995](#)). It is based on the assumption that the natural biota is active in both the formation and maintenance of its environment in contrast to the notion of natural biota merely adapting and responding to random changes in the external environment (see [V. G. Gorshkov 1995](#); [V. G. Gorshkov, Gorshkov, and Makarieva 2000](#)). Advocates of this approach argue that humankind is incapable of substituting for the complexity of the biota's regulatory mechanisms and thus must endeavor to ensure that the integrity of the biotic system is not compromised. This obviously demands detailed and precise knowledge about the functional aspects of the biota. The concept has specific social implications. For example, it has stimulated calls for population reduction in order to reduce pressure on the biota's regulatory mechanisms, calls that have been sharply criticized in the Russian literature ([Alekseenko 1999](#); [Burovskii 1999](#); [Sdasyuk 2002](#)).

It is unfortunate that much of the recent discussion about landscape in geography has ignored Russia, particularly that part of the discussion that involves sustainability concerns. Not only does Russia have its own distinctive tradition in landscape science, but the country is an important participant in the international Rio process and in the Kyoto agreement. And since it is by far the largest country in the world, what happens there must be a key issue in the search for global sustainability. Russian geographers and other scientists are keen observers and frequently intense critics of both the Russian and the global environmental record as it unfolds, and the country is characterized by heated debates at both the political and the scientific levels (e.g., see [Lavrov 1999](#); [Chistobaev 2001](#); [Kondrat'ev](#)

[2002](#); [Zubakov 2002](#); [Klyuev 2004](#)). Russia's move toward a market economy and democracy since 1991 has by no means solved the environmental problems inherited from the Soviet era; indeed, some have grown worse, even as new ones have been added (see [Oldfield 2005](#)). Landscape scientists therefore have much to do to draw attention to, and to try to combat, the developing environmental problems in agrarian landscapes, forests, and elsewhere under the pressures of the new market economy.

## **Conclusion**

In discussing the Russian landscape science tradition, and comparing that tradition with analogous traditions in the West, it has been noted that the landscape concept has been contested in both cases, although there has been a common interest in landscape's biophysical features. Russia's own tradition in landscape science derives partly from the country's long-standing record in the environmental sciences associated particularly with the work of Dokuchaev, but it can also be related to the particular interpretation given to landscape by the geographer Lev Berg, who was influenced by the German school of landscape geography. Russian landscape science as it evolved was also affected by a number of cultural, political, and ideological factors that were peculiar to Russia. Internationally, then, landscape geography displays its own "geography of scientific knowledge." But it must not be imagined that geography is unchanging or in any way uncontested. Rather, in the international quest for sustainability there is an urgent need and much scope for students of landscape everywhere to share their interests and to make a significant contribution to the conservation of the global environment.

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## **Notes**

1. Notable exceptions include [Arntz \(1999\)](#) and the literature on landscape ecology, discussed later in this article.
2. The focus of this article is on Russia in its pre-1917 imperial, 1917-1991 Soviet, and post-1991 manifestations. No specific consideration can be given here to discussions relating to the ethnically non-Russian areas that established independent states after 1991.

3. [Berg \(1947, 17-18\)](#) distinguishes between “harmonious” and “dissonant” relief forms. Because it takes time for relief to respond to climatic influences, climatic change often means that the relief of a particular landscape may now appear “dissonant” to the prevailing climate. By way of example, he cites the dunes along the shores of the Gulf of Finland now being invaded by trees. The dunes were produced not by the present-day climate but by the drier climate of the glacial period. Such dunes now constitute relict features of the earlier climatic period.

4. Berg alternatively used the terms “geographical zones” or, following Dokuchaev, “natural zones” for what in the English-speaking world are often referred to as the major “biomes,” “the broadest, most comprehensive communities recognized by ecologists.” See [Kerski and Ross \(2005, 24-28\)](#).

5. [Olwig \(1996, 644\)](#) writes that Sauer's “concept of landscape is virtually unthinkable without people,” but, as his accompanying reference to Sauer's essay makes clear, it is also unthinkable without nature.

6. Leighly pointed out that Sauer later rejected many of the doctrines he had propounded in his 1925 essay. However, the idea of landscape's biophysical character was not one of them. See [Leighly \(1963, 6\)](#).

7. Sauer asserts that “the physical area is fundamental to any geographic study because it furnishes the materials out of which man builds his culture” ([Sauer 1963, 340](#)).

8. There have, of course, also been ongoing European “cultural landscape” traditions. See [Arntz \(1999\)](#) and [Livingstone \(1992, 262-71\)](#).

9. Dokuchaev argued that many aspects of human society could also be correlated with the zones.

10. Dokuchaev was himself Russian, was educated and employed at St Petersburg, and came to prominence as a result of his work on Russian environmental problems and especially on Russian zonal soils. Of course Dokuchaev's science cannot be divorced from its broader national and international context. The Russian tradition of environmental science stretched back into the eighteenth century when foreign scientists (especially the Germans) had initially taken a prominent role. Russian environmental science in Dokuchaev's day was much influenced by the work of scientists like von Humboldt, Lyell, Darwin, and Marsh, as well as by the Russian naturalists K. von Baer (1792-1876), K. F. Rul'e (1814-1858), K. A. Timiryazev (1843-1920), A. F. Middendorf (1815-1894), and N. A. Severtsov (1827-1885).

11. Chorology, so called from the Greek word *chōra* meaning region, is used in reference to the principle that the essence of geography is the study of places or regions.

12. Hettner used the term "landscape" alongside other terms like "parts of the earth" "countries" and "places" (e.g., see [Hettner 1930](#), 120). Clearly his concept of "landscape" was less precise than that of Berg.

13. In this connection we would question [Turner's \(2002\)](#) somewhat overdrawn distinction between spatial-chorological and human-environment identities in geography. It seems clear that neither Hettner nor Berg regarded geography as the study of the distribution of separate phenomena in space, but rather of the interconnections between different phenomena located together in space. As [Berg \(1915\)](#) wrote, geography is not a chorology of separate things and phenomena but a "chorology of communities (*soobshchestva*)"—in other words, of landscapes. In Berg's view, following Dokuchaev, a landscape was a complex biophysical phenomenon subject to physical laws. Hettner's value for Berg lay in his apparent recognition of landscapes as central to geography, thus endowing it with its own object of study rather than with an approach only, though Berg was also critical of Hettner's vague and seemingly unscientific understanding of landscapes.

14. It is notable that Berg and other Soviet geographers were quite critical of aspects of Passarge's work, citing its formal nature with too much attention paid to spatial correlations between landscape components at the expense of real interlinkages, its lack of a genetic dimension, and insufficient emphasis on soils and fauna ([Berg 1931](#), 30; [Isachenko 1971](#), 266-7, 291-4).

15. This orientation was also related to the scientific prestige of such branches, alluded to above.

16. For example, the journal *Eurasian Geography and Economics*, formerly *Soviet Geography*, once routinely translated and published material by Soviet geographers, but since 1991 has largely restricted itself to articles by Western scholars, occasionally coauthored by Russians.

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