о. м. чинся ля остио за веранагиался^{ні н}ани уеманст акрана водалагиался^{ні н}ани із лька зв де де доді снен со, ща налучи восок лька зв моче. х чіпссл ЭНЕ рвы елене рлр 00 оглад юй умри њер, ошениеднуд «e: WH · • Π(Mer. IЛ Н (Нас В. ar чолзансыя ас сослании госса с эмико голи Сучемнип. дуг е зя, ке ск^{4K}я ззбыл лкг (С.О_д нисил € 31^{eT} M V РрсЭ. ньие бс. в ч^{сн} езлысти узоыллп сод персо ньие бс. в ч^{сн} езлие зжера бч леі согай зтнєму ль г^{вь}и плику адоюзера эе; д_{мпрлили} эт(BOL) aict(TC, И. й еуміе лацоїсз'є ссім ілик (ацоїсз'є ссім) аісто unit K de ξ Ч Kesthour Del ₽_\й;-Cachen and the shire c 13^{ПЕ 10}орите DKOT (TILK OPATA вуетК orce эИй дрягОна цис. уВ TOM. H2 ло раз разви (лекол OFX о елА, прят 10 рам Бл п.н. те о тал ветоіча икло CREDC Bell C KCKT DM3 Cro YHCUM CC BHH 3 A T H C рильил ю, EKE OF TEBRE)Hf заки M O.M.I -AL ВЗИ, fы_{то}. ₽З нц Пур те плаги ж зоетноси че ча 1 JIV б_{IT}обэ сIE ч HI Tan ato Был біга м, te, terutiny There is the 3C' Уун IIKC OTAFA деилб(3 June iei аюі^нютчей h e cer 0 B B T B Kol DE 10 Лай **3**15 x kip 01. H W) Ciolbes O H W. уг рз у TC коз міаніуч "зре. Ma or OIRA Jorli er. Y; , ге шьс. и обеа кл лсокимлогке. I. »б(K rc olce ступстизъ имборна H Этцанби об эт с ганританст Эль ух ⁴¹лести, B) ; Б^же-Yo ксуда! В л 13⁴Н Тра сунала пуста сомпрен-ксуда! В л 13⁴Н Тра сунана пуста сомпрен-тажко, Кость, 9 сь волов тк вса дел. эк узколь в стажко, чулов сь волов сволицист. эк нев ру ЪŖ ристаажо, кость, о сь воли тк вса дел. эк узколь в ссляелавь с чупое сь воли тк вса дел. эк — нев ру, ня еснь га и п. соо: к сведней ст с вы орого-ткихкех узан Ізярсв ю за ссе мсев ч.т, статачіть- сависеку с лан Гв кигелы своло, мсев ч.т, HOC eser H/T, гет, стаганігь- («міжек у ант па китеры сасве мсев ч, ищ уюче, ютанаекус, й:м гв китеры с врло, на бо м, иц ую. с, когазгене орозес гьзи с cep а. ^{пл}етва,» о-Над потоликссанинс рексесталулуну насела,» о-и йсченокок ег во латоталулуну pros» по. Б и йсченокок екан жорм пасели екан наз» по. Б курт жорм пасели екан наз 4 HI чега исланово егоро и паселе са монт свре и куот, жори паселе са cl3-rpaie i las B(rak^{BC}aловрени слося нови сіз-трале і назвітаквса-м, нагарі ертіос чи, в слачнт, сіз-трале і некп. у, сос не е-нагарі био тісм су, лакразд Цит. у, сос не-кет ціни био тісм су, лакразд Сит. раимарбую чт тп. м и рания И-ЦЕИЧЕ МЯ отточэг:Х Щой THE SIN_a journa o HCO enan KUETUBEORSCHUNG ю,р'ї сте i J ceKlp OFT IT BI ^{лЗ}чео кл ичати тестьою и. 3778 Рачпия й казна. Гтралкоски, узром ыезірэск ^і,зинс г п/льт едно, мндай та ся O^cTe⁵ ИНС II II OLIFICITIO, INHORITINE CS. ЧЕЛ СЯ Та³ WMY Т IAI^PCT^T ВЛ(ОбШіНСак НЕ.) рьог векегсрести, в'Врам ата благ бу р^{IC} (О ВЕ Т. НІВа БІХ ИС Х(ЯЧА И⁵, САЗО ГДИ СП Ва ВЕ Т. НІВа БІХ ИС Х(ЯЧА И⁵, САЗО ГДИ СП Ва рас : :p r cellтањ, јес Е ^тше ⁴Л^К feya,hc лины торгана водать у эвска I Paris, oHсе кли_{1ВБ}е этер $_{10}$ с. ист олов ћион илет овс у сто Б ртосројa ж. пр илет улах – ца Ббу еНА ек т жоц улах – ца Брен, с и леу беок, стосицейочка з ся с фре ег 51 TI рин T. дне лсур HU. беов, сточацейочка з кал фрс ер FR Ki Api 29:₉₇ ICH.I

² мения но полюфеним стоек с ундадца ла ло порожето бытаутено 23 Дени мын чени дамания с полюченимени пре ло с ридадца ла ени пре д'ассярдей пол иснин погожко была аутонов ж ня зу, порилис пром бег сите м от в жтении ж ія зу, полатре, кольжи, ы, сза ч – нли Длеатре, кольжи, ы, сза ч пос и,зус: увтся льсдар сно оди Бе меехух описатюло одия л ейратры, с – ъ суе в ј комуть імсночные залисечу от сла м Са ЖТСШИ) вгдат сту сп MEЫBа а нери так гл не го зну, а м ШК ЈВЫ e Ca гел себ инзенсдат Скося мкой пн, «ыва уже умы, убез нета пр ны. кр нать сылом карии уо ort, [кр-диать с изтом каажчу м ллодски я, Кь мецлинтун э. Гадив ттуп энцев, убелук вилче разъь, тавио слауть сь. не се ково на орни съ. се ково на орни съ. се ково на орни по съ. на пръбезиши ирзоспетс: но игло печи пр по съ. на я, к^{и в}ый ымгь и зъя драту, се зна орни сечи пр с-облять оый ко пт кид зеднуж И 00 зна рял!нецьто, Ируг нено атек-толсемимле (a. 🗽 🕺 эся, удј ум_{сон} азъзре-١a BOIN AC - по анс ду ир, MM. NH.)E трє—л илько заклще це нак ца Jac. K _H€ пает и бы им на аснин Ьй З СЯ rea ae ocaj н): е ί, Ia aŀ yn roi VIV S юшомє ь БЫ. ев Ка-троп энно ière нонсег.1 arcypt ски И, ді_{(атю бі} слиб вор Га? јенг гос;чен^ак б ч Грета слья. А посе нчусттевриануу о QOLRа сеперхорс лановсе Ста сломе тре- и, каўнос⊧ - ня V и дя поусс с, ерачисенигод ве оп_{тит}уг се со влетруе тъке жеси I_ А води НЫМ POTOPгщи извазиди Ј со обчију с тъкс зерсси (por) с⁵ум, Врние, ткак общена и зерсси рток₅, Дяпу ^{В4й} т ни «Р^{ивор}ш.ся, ето сэстрацелло (У. К⁵ед мавета гр сами воворатака итсиями SHHO "Ж° СВуп ули. Елж вовор так итсия_{чи.} да , Таеннс не овачибыле. Блгот, Г Я, Таеннс не ременжно небстей х Лучо, кор¹нас ременжнок гасай х (пи Эт жрок Га ступут эли.. Елж вовор: так чла этсенно не овачиюыл улице Y П)НЦелье нык так ну. Эт жирок р)0ч:вор нак так ну от жрок ке эсл вор нак текам, ; стак то равса по х т д)чеготи родеьодионе но. То это по х т **AHE** уак олы родеьздиони н... Те ср мбуумоготруузак олы род водион, не и сел р мо ум узак олы башелкозналтоть « есл ют но, ноб и И сончимылиростсть эрне, эжил в осел сончимы и води и ма в но, рыколь

є неда (61 слув одій)па)

зерсие и мынерати д мения но полофсьим снось

сіольны сжуляенлисушмыс чет, усъя, Э ме Губ ож чаменлико и поч и туу м они, к тсудаго о с закур поч и туу заки гор-эс — суз. ак эшые удаю люте э я. онч Гаф пно-Іудаїст зайу экон рось та і бу јес — ійюні ак зоков пр оде На сны іт заї з чудк цут, чь! зарвстосй! ч. tсенні нави ли деколде! 0 нат мстью в (3 чун тулчы! зарветосни тро тро навили маел: Грасинаколето, с назум тро г неоли СТВЯ маелі Пас_{ина}коїето, с назум т г наоль стви ссам ощи нес дегуст маожн², но ознту на опи-чє — Нзл'А м^{лог} пени кен пол ознту На ыхория од Пато I в одни, и в o to Tt ni Ho opte реловни сец пол рем, и в в но сизбанто вле орге сло совыти одне орге сло -5εрспкут кг)м рс,!); леговьг ц Дг эт — нев иескиавраери€ ль ы ду мс 3364AT4 от парі наскараство пь парі сторі з на жесли 4 **IIKO**I

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ECOLOGY IN EASTERN EUROPEAN TERMINOLOGY INTRODUCTORY REMARKS

Tatjana Petzer

The Soviet Union is remembered as a lab for socioeconomic changes on larges scales and environmental catastrophes: the Chernobyl disaster, the Aral Sea tragedy, and ecocide¹. However, little is known about the groundbreaking concepts and theories of Russian and early Soviet science which laid the foundation for systemic ecological thinking, environmental consciousness for nature conservation, and corresponding initiatives of the revolutionary years after 1917. The isolation of Eastern Europe that came as a result of Stalinism and the Cold War led to Soviet science developing its own scientific approaches and terminology during the 20th century. This does not only include ideological constructions and practices such as the pseudo-scientific Lysenkoism² which outlawed genetics and led to disastrous effects on agriculture, the people, and the scientific community. Soviet science has also managed to continue and unfold the new concepts and interdisciplinary dynamics of the ecological turn on the threshold of the 20th century, a development which, at that time, was only sporadically noted in the West. In the context of its thematic focus on Eastern European ecological terminology, this issue discusses a selection of these concepts.

Russian and Soviet scientists were always aware of and reflected upon their own contributions and the different potentials of environmental and ecological sciences. Their milestones include:

- the foundation of early soil science by pioneering Russian professor of mineralogy and geology at the St. Petersburg University, Vasilii Dokuchaev (1846–1903), who developed a combinatoric approach to environmental factors such as geology, topography, climate, and organisms, and, in accordance with their interaction, formulated the first soil classification system distinguishing >natural-historical zones< (*estestvennoistoricheskie zony*)³ such as the taiga, tundra, steppe, and others;
- the foundation of scientific forestry by Georgii
 Morozov (1867–1920), who was appointed professor for this field at St. Petersburg University.
 Here, he systematically developed the fundamentals of community ecology, also referred to with recourse on the notion of *Biozönose* (biocoenosis) as coined by the German zoologist Karl Möbius which describes interacting organisms within a habitat as biocoenology or synecology. Morozov was a vehement advocate for the foundation of nature sanctuaries (*zapovedniki*) in which any human activity other than scientific research was prohibited by law,⁴ a necessity he postulated in 1910 at the Congress of Russian Naturalists;
- Aleksei Pavlov's (1854–1929) recognition of humanity as the main force of the Earth's evident change and its impact on a geological scale. In 1922, the professor and founder of the Moscow

See Murray Feshbach, Alfred Friendly (eds.): *Ecocide in the* USSR: Health and Nature under Siege, New York: Basic Books 1992.

² A neo-Lamarckian doctrine developed and practiced by the agronomist Trofim Lysenko (1898–1976) and his supporters who claimed that crop plants could be >educatedto free themselves from dependencies on soil and climatic conditions—to be transformed by being conditioned to new environments.

³ Borrowing from German terminology, the geographer Lev Berg (1876–1950) replaced Dokuchaev's ›natural zone‹ with ›geographical landscape‹ (geograficheskii landshaft).

⁴ Under Lenin, the resolution »On the Protection of Nature, Gardens, and Parks« was approved by the Soviet government in 1921. See Douglas R. Weiner: »Community Ecology in Stalin's Russia: >Socialist and >Bourgeois Science «, in: *Isis* 75 (1984), no. 4, pp. 684–696.

school of geology introduced the alternate geochronological notion of the ›anthropogene period‹ (*antropogennii period*) or ›anthropogene‹ (*antropogen*)⁵ as a substitute for the entire quaternary, a notion which was broadly used in the Soviet Union and Eastern Europe since it was officially accepted in 1963;⁶

 the rise of global ecology, or, in the words of Vladimir Vernadsky⁷ (1863–1945), a student of Dokuchaev and professor of crystallography and mineralogy at Moscow University: the >planetarian role< of the >living matter< in the >biosphere<, a notion adapted from Austrian geologist Edward Suess who coined it in 1875 to distinguish the life-saturated envelope of the Earth's crust. However, Vernadsky used it to emphasize the anthropogenic transformations of biogeochemical cycles of the biosphere which, in turn, alterates itself towards a >noosphere<.

At this point, the aforementioned concept transfer allows for a recourse towards the polymath of the Russian Enlightenment, Mikhail Lomonosov, who, after being educated in humanities, natural sciences, and engineering in St. Petersburg, Moscow, Kyiv, Marburg, and Freiburg, introduced the linguistic basis for higher education into the Russian language and Russian terminology for his wide-ranging, multidisciplinary research from Earth studies to astronomy. His goal was to understand that the migration and translation of concepts is more than the appropriation of Western science and thought upon domestic learning. The Russian Academy of Science was recognized in the scholarly world and has maintained international cooperation. Nevertheless, conceptual migration processes in the opposite direction were non-existent or marginalized. Even though prerevolutionary and early postrevolutionary science was multilingual and present in international academic journals, concepts and theories from Russian and early Soviet geosciences were barely noted, let alone Russian-language publications, for instance

on the establishment of interdisciplinary research fields such as permafrost science or permafrostology (mrzlotovedenie), which was later renamed to >geocryology <.8 Here, a prominent example is Vernadsky's work on the biosphere: he taught at the Sorbonne in Paris between 1922 and 1926, where he published La géochimie (1922) and developed his concept of the biosphere, which was published in 1926 in Russian (Biosfera) and translated into French in 1929 (La Biosphère). However, this work remained unrecognized for decades, due to the terminological confusion, the misleading notion of the biosphere in general, and Vernadsky's holistic sphereological approach to the biogeochemistry of life and ecological co-evolution.⁹ Moreover, the retrospective misreading of Vernadsky to fit the Soviet ideology of a collective communist human world transformative agency¹⁰ neglects the scientists' resistance to the political bias as well as their independent and global ecological thought.

In addition to Paris, Berlin and London must be mentioned as places for the transfer of ideas of Soviet provenance: in 1927, the Russian Naturalist Week¹¹ was initiated in the context of the Soviet government's exchange agreement with Germany, followed by the Second International Conference on the History of Science and Technology in 1931, where scientists from the Soviet Union affected socialist thinkers and the British tradition of »red science«.¹² A few years later, the relationship between the East and the West changed, and all of the 1931 participants, together with further ecological scientists and thinkers as well as opponents of Lysenko fell victim to the Stalinist purges.¹³ Nevertheless, the interest in Soviet science

- 9 Nicholas Polunin, Jacques Grinevald: »Vernadsky and Biospheral Ecology«, in: *Environmental Conservation* 15 (1988), no. 2, pp. 117–122, here p. 118.
- 10 Simon L. Lewis, Mark A. Maslin: »Defining the Anthropocene«, in: *Nature* 519 (2015), no. 7542, pp. 171–180, here p. 173.
- 11 Oskar Vogt, A[leksandr] E. Fersman: »Die Russische Forscherwoche in Berlin«, in: Osteuropa 2 (1927), no. 8–9, pp. 459–465.
- 12 John Bellamy Foster: The Return of Nature: Socialism and Ecology, New York, NY: Monthly Review Press 2020, p. 334.
- 13 See John Bellamy Foster: *Capitalism in the Anthropocene:* Ecological Ruin or Ecological Revolution, New York: Month-

⁵ The Russian - gen < suffix usually signifies a geological period.

⁶ A Commission for Quaternary Research was established in 1927 and chaired by Pavlov in the first couple of years. The commission's second session on stratigraphy accepted both >quarternary< (chetvertichnyi) and >anthropogene< (antropogenovyi) as equivalent terms.

⁷ Cyrillic letters are transliterated according to the Library of Congress romanization system, however, in the body of the text, familiar spellings of names are used in some cases (e.g. Vernadsky instead of Vernadskii).

⁸ See Mikhail I. Sumgin: Vechnaia merzlota, pochvy v predelach SSSR [Permafrost Soils in the USSR], Moscow: Akad. Nauk SSSR 1926. Id.: Obshchee merzlotovedenie [General Permafrostology], Moscow: Akad. Nauk SSSR 1940. Petr F. Shvetsov: Vvodnye glavy k osnovam geokriologii [Introductory Chapters on the Principles of Geocryology], Moscow: Akad. Nauk SSSR 1955, pp. 23–24.

persisted. In 1939, British ecologist Richard Carpenter reviewed the latest achievements of the synecological research conducted in the Soviet Union, including an 18-page-long list of his East European colleagues' publications.¹⁴

The Purges, the Second World War and the Cold War, Stalin's 1948 Plan for the Great Transformation of Nature, geoengineering, and Lysenko's attempt to intervene into forest management as well as the environmental degradation in the decade following Stalin's death in 1953 (Lysenkoism was not condemned and abandoned until 1965)¹⁵ finally led to a caesura in ecologic science and environmental consciousness. First and foremost, there was the influential concept of biogeocoenology which was derived from forestry. Established by the geobotanist Vladimir Sukachev (1880–1967) in the 1940s as a further developmed form of biocoenology and as a >biospheric< science in Vernadsky's sense, it provided the backbone to oppose and ultimately defeat Lysenko in the early 1960s.16 Sukachev was aware of the closeness of his concept of biogeocoenosis to the Western »rather vague and not entirely unambiguous« notion of the ecosystem,¹⁷ which, after being introduced by Arthur Tansley (1935), was hardly used until the Odum brothers' systematic take on an ecosystem ecology after the Second World War.¹⁸ Secondly, on this fertile scientific ground of biogeocoenosis and its mathematical modelling of the 1950s and 1960s, Soviet climatology surrounding Mikhail Budyko (1920–2001) provided first calculations on the alarming interactions

ly Review Press 2022, pp. 274, 335.

- 14 J. Richard Carpenter: »Recent Russian Work on Community Ecology«, in: *Journal of Animal Ecology* 8 (1939), no. 2, pp. 354–386. See also id.: »Review: A New Russian Textbook in Ecology«, in: *Ecology* 20 (1939), no. 2, pp. 310–312.
- 15 See Zhores A. Medvedev: *The Rise and Fall of T. D. Lysenko*, New York, NY: Columbia Univ. Press 1969.
- 16 In a booklet, Sukachov only praised Stalin's transformation project to draw attention to the importance of forest protection, also describing (but not commenting on) Lysenko's plan to plant trees as a shelterbelt network – a plan which was deemed to fail from the very beginning. See Akademik V[ladimir] N. Sukachev: *Stalinskii plan preobrazovaniia prirody* [Stalin's Plan of Transformation of Nature], Moscow: Akad. Nauk SSSR 1950, pp. 15–19.
- 17 V[ladimir] N. Sukachev, N[ikolai] V. Dylis: Osnovy lesnoi biogeotsenologii, Moscow: Nauka 1964. Engl.: Fundamentals of Forest Biogeocoenology, Edinburgh: Oliver & Boyd 1968, p. 13: »poniatie ėkosistema dovol'no neopredelenno i ne vpolne odnoznachno«.
- 18 See Eugene P. Odum: *Ecology*, New York: Holt 1963. Howard T. Odum: »Ecological Tools and Their Use: Man and the Ecosystem«, in: *The Connecticut Agricultural Experiment Station, Bulletin* (1962), no. 652, pp. 57–75.

between the cryosphere, the Arctic greenhouse effect, and global climate change.

Following the early mystification of Vernadsky as philosopher of ,Russian Cosmism,¹⁹ Sukachev was consequently attributed to this line of thought.²⁰ Citing Soviet scientists and their concepts as an exotic side stage of the history of global ecology, ecocriticism, and the Anthropocene debates, recent studies provide profound insight into the interaction between Soviet and Western scientists and its impact on contemporary ecological discourse.²¹ There is also a domestic post-Soviet (post-colonial) re-thinking of Russian ecological and revival of holistic biospheric thought.²² Recognizing the quick adaptation of Western popular concepts re-connect with the Western scientific discourse, the revision also includes the re-evaluation of terminology.23 As a starting point, these post-Soviet developments chose the postulate of a Russian paradigm of non-Western (non-Darwinian) ecological and evolutionary thought which is not only different, but more prolific than the Western one.²⁴ This paradigm includes parameters such as the

- 20 Petr Karako, professor of philosophy at Belorusian State University, claimed that Sukachev succeeded Vernadsky's cosmism. See P[etr] S. Karako: »V.N. Sukachev i russkii kosmizm« [Sukachev and Russian Cosmism], in: Vestnik VGU. Seriia Filosofiia 2020, no. 1, pp. 15–28.
- 21 See Jonathan D. Oldfield: *The Soviet Union and Global Environmental Change: Modifying the Biosphere and Conceptualizing Society-Nature Interaction*, London: Routledge 2021. Marco P. Vianna Franco, Antoine Missemer: *Early Soviet Ecology. A History of Ecological Economic Thought*, London: Routledge 2022.
- 22 In his last years, the historian of natural sciences Eduard N. Mirzoian (1931–2014) started documenting Soviet biosphereological approaches and ecological theories in the series *Stanovlenie ékologicheskikh kontseptsii v SSSR* (The Formation of Ecological Concepts in the USSR), published since 2013. Their publication continued after his death under the redaction of his pupil.
- 23 See E[katerina] A. Grigor'eva, A[rkardii] I. Grigor'ev: »Istoriia formirovaniia sistemnykh poniatii i terminov v ėkologii« [History of the formation of systemic concepts and terms in ecology], in: Omskii nauchnyi vestnik 106 (2012), no. 2, pp. 156–159.
- 24 See G[eorgii] A Zavarzin: »Smena paradigm v biologii« [Paradigm change in biology], in: Vestnik RAN 65 (1995), no. 1, pp. 8–23. A[leksei] M. Giliarov: »Stanovlenie ėvoliucionnoga podchoda kak ob'iasnitel'nogo nachala v ėkologii« [The formation of the evolutionary approach as an explanatory

¹⁹ Russian cosmism is an umbrella term coined by adherents of the eccentric self-thought philosopher and religious thinker Nikolai Fedorov. The term aimed to unify a broad spectrum of scholars and biopolitical utopianists which were included in the eponymous anthology. See S[vetlana] G. Semenova, A[nastasiia] G. Gacheva (eds.): *Russkii kosmizm: Antologiia filosofskoi mysli* [Russian cosmism: anthology of philosophical thought], Moscow: Pedagogika 1993.

nutrient cycle, decomposition by microorganisms,²⁵ synthesis, and biogeocoenotic evolution.

Against this background, the international network »Russian Ecospheres. Forms of Ecological Knowledge in Russian Literature, Culture and History«26 was established last year. It is funded by the German Research Foundation (DFG) and collaborates in the interdisciplinary investigation of the Russian²⁷ paradigm of ecological thought. All contributors to this issue are members of this research project, with the exception of an extern expert from Kyiv, Alexander Protasov, Professor at the National Academy of Sciences of Ukraine's Institute of Hydrobiology. In co-authorship with Georgy Levit, a private lecturer in biology at the University of Jena,28 the two experts on Vernadsky dedicated their paper to the Ukraine period of Vernadsky's work and his concept of living matter (zhivoe veshchestvo). Tatjana Petzer, professor of Slavic literary and cultural studies at the Karl Franzens University of Graz, provides an introduction on Sukachev's notion of biogeocoenosis (biogeotsenoz). Both concepts are closely linked to the establishment of integrative disciplines in the Soviet Union, biogeochemistry, and biogeocoenology. A third cross-disciplinary area of study is introduced with the review on a survey book on *Geocryology* by Andy Bruno, associate professor of history and environmental studies at Northern Illinois University and an expert on the Russian Arctic.²⁹ Mieka Erley, associate professor of Russian and Eurasian studies at Colgate University and author of a book on Russian soil, discusses the Russian notion of metabolism (obmen

- 25 S[ergei] N. Vinogradskii: »O roli mikrobov v obshchem krugovorote zhizni« [The role of microbes in the general cycle of life (speech of 1896)], in: *Vestnik RAN* 66 (1996), no. 12, pp. 1116–1120.
- 26 For more information see https://russianecospheres.org/.
- 27 Here, >Russian< refers to the historically grown epistemic framework for approaching the entangled Northern Eurasian space.
- 28 George S. Levit: Biochemistry Biosphere Noosphere. The Growth of the Theoretical System of Vladimir Ivanovich Vernadsky, Berlin: Verl. für Wiss. und Bildung 2001. A[lexander] A. Protasov: Kontseptsii biosferi i zhivogo veshchestvo v prilozhenii k issledovaniiam zhizni v gidrosfere [The concepts of biosphere and living matter applied to the study of life in the hydrosphere], in: V[olodimir] I. Vernads'kii: Geokhimiia zhivoi rechovini [The Geochemistry of Living Matter], part II, Kyiv: Veles 2012, pp. 551–571.
- 29 Andy Bruno: The Nature of Soviet Power: An Arctic Environmental History, New York, NY: Cambridge University Press 2016.

veshchestv) which refers to both circulatory systems for constituting ecological as well as social equilibrium.³⁰ Clemens Günther, research associate for Slavic literature at Freie University of Berlin, and Philip Kohl, research associate for Slavic literature at Ludwig Maximilian University of Munich who currently holds the Feodor Lynen Research Fellow position at the University of Zurich, both initiators and coordinators of the Russian Ecospheres network, provide a system-theoretic perspective. Departing from conceptual history, their contributions on the notions of regulation and irreversibility respectively analyze the interdepending conceptualization of nature and culture within the realms of the emerging computation, cybernetics, and semiotics of culture. Thus, they demonstrate one of the network's basic concerns: the interdisciplinary approach to a genuinely multidisciplinary science (or, rather, a bundle of ecological and environmental sciences), its cross-cultural framework of terminology, and its undisciplined thought in the Russian longue durée.

principle for ecology], in: *Zhurnal Obshchei Biologii* 64 (2003), no. 1, pp. 3–22. Edmundas Lekevičius: »The Russian Paradigm in Ecology and Evolutionary Biology: *Pro et Contra*«, in: *Acta Zoologica Lituanica* 16 (2006), no. 1, pp. 3–19.

³⁰ Mieka Erley: *On Russian Soil: Myth and Materiality*, DeKalb: Northern Illinois Univ. Press 2021.