ISSN 2079-9705, Regional Research of Russia, 2021, Vol. 11, No. 3, pp. 315–326. © Pleiades Publishing, Ltd., 2021.
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THEORETICAL AND METHODOLOGICAL FRAMEWORK OF SOCIAL GEOGRAPHY

"Polarized Landscape": Half a Century Later

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Received January 24, 2021; revised March 1, 2021; accepted April 21, 2021

Abstract—The article is devoted to the polarized landscape concept (also known as the polarized biosphere concept), developed by the author in 1970. The socioeconomic conditions for implementation of the conceptual project are considered, as well as changes in these factors and corresponding fundamental concepts over the past half century. It is demonstrated how the ideal model of the territorial structure of the cultural landscape is related to the lifestyle of its creator; how his ideas about work and leisure formed the pattern of a regular network of cities surrounded by buffer functional zones with decreasing population density from the center to the periphery, occupied by natural parks and reserves. The big city and wildlife are considered the equivalent poles of the biosphere. The author traces how Russia's transport infrastructure has changed and how modern transport policy, at least in Moscow and Moscow Oblast, contradicts the ideas of a polarized biosphere. At the same time, the growth of territorial contrasts of socioeconomic development leads to growth of the so-called inner periphery, where the processes of restoration of natural landscapes proceed spontaneously as the anthropogenic load decreases. Some polarization of the landscape favorable for the biosphere, occurs by itself, and this process should not be hindered. The author traces the relationship of his concept with classical works on theoretical geography, in particular, with *The Isolated State* by I. von Thünen; he talks about the history of penetration of the polarized biosphere into the national geographical science, and outlines paths for further development of this project.

Keywords: biosphere, landscape, city, transport, settlement pattern, nature conservation, econet, functional zoning, cartoids

DOI: 10.1134/S2079970521030102

INTRODUCTION

In 2020, the polarized landscape (PL) or polarized biosphere (PB) concept celebrated its 50th anniversary. For those familiar with this concept, it is primarily associated with the cartoid, but what is behind the diagram? In which region and which people "could" or "should" live in accordance with this project? Despite its fairly wide popularity and already long life, the PB has not yet been discussed in the scientific community.

In this article, the phrases PB and PL are used mainly as synonyms, alternating for stylistic diversity, but in some unspecified cases they are implicitly different: the PB is a general concept, a global spectrum of zones, and the PL is a more local system formed and permeated by a transport network.

The PL is a concept of the ideal territorial structure of the cultural landscape for the harmonious coexistence of man and nature, one of the approaches to the functional zoning of a territory. It builds on the idea that a big city and wilderness are opposite and equal types of the environment. Between them are other

[1] In May 2021, Boris Rodoman celebrates his 90th birthday. This remarkable geographer made an extremely important contribution to the formation and development of theoretical geography in the Soviet Union. Back in 1956, he published a major work "Methods of Individual and Typological Regionalization and Their Depiction on a Map" (*Vopr. Geogr.*, vol. 39, Physical-Geographical Regionalization, Moscow, 1956, pp. 28–69), which is still of great methodological value. His subsequent articles attracted the great attention of Soviet and foreign geographers. Here are just a few of them: Logical and Cartographic Forms of Regionalization and Their Study Objectives, *Soviet Geogr.*, November 1965, pp. 3–20; Mathematical Aspects of the Formalization of Regional Geographic Characteristics, *Soviet Geogr.*, November 1967, pp. 687–708; Human Activity and Social-Geographic Regions, *Soviet Geogr.*, March 1970, pp. 155–165; Territorial Systems, *Soviet Geogr.*, February 1973, pp. 100–105; Certain Trends of Development in Theoretical Geography in the USSR, *Soviet Geography Today (Aspects of Theory),* Moscow: Progress, 1981, pp. 187–200 (coauthor); Constructive Significance of Theoretical Geography, *Soviet Geogr.*, February 1982, pp. 110–115 (coauthor); Basic Types of Geographical Boundaries, *Soviet Geogr.*, January 1983, pp. 48–59. The concept of a polarized biosphere, which for many decades has not lost its scientific and applied significance, occupies a special place in Rodoman's creative work, which is diverse in topics. This article is based on a report prepared last year for a scientific conference dedicated to the 50th anniversary of this concept. The editorial staff of the journal *Regional Research of Russia* congratulates Boris Rodoman on a spectacular anniversary, admires his creative longevity, and wishes him good health and new scientific achievements!

functional zones, intermediate in terms of density of the resident population, degree of intensity of land and nature management, and transport accessibility (Fig. 1).

Settlements, expanding along roads, in fact divide a territory into cells too close to accommodate the necessary elements of the natural landscape and the habitat of quite numerous wild animal populations. It is necessary not only to command the surviving corners of nature, but also to connect them with wide green corridors into a single massif covering the entire land.

In the PL, two main transport systems intersect: (1) utilitarian roads for speeding people and goods with public business centers in urbanized hubs; (2) natural paths of wild animals converging to reserves. Functional zones are built on the backbone of the paths, a third network is built into them, an additional one is recreational, diagonal in relation to the others.

The PL concept takes into account the specifics of Russia and differs from foreign econet projects. The main differences are: (1) administrative boundaries serve as the main axes of green corridors; (2) the advantage of public transport over cars is preserved; (3) the main means of nature conservation is *relatively* poor transport accessibility.

The original cartoid (see Fig. 1) is intended for local transformations. The bottom of the figure shoes the coastal version of the PL. In further approximations, the relief and hydronetwork are taken into account.

The possibility of the PL functioning as depicted in the author's three books (Rodoman, 1999b, 2002, 2007) in the basic diagram is based on many explicit and implicit postulates and is limited by various conditions, the joint feasibility of which is far from obvious. I will compare some elements of the PL model with the facts and phenomena observed in Russia today, as well as with constructions from paragraphs of (Rodoman, 1999b). But this will not be propaganda and protection of my diagrams, but on the contrary, rather their destruction, perhaps in order to reassemble them.

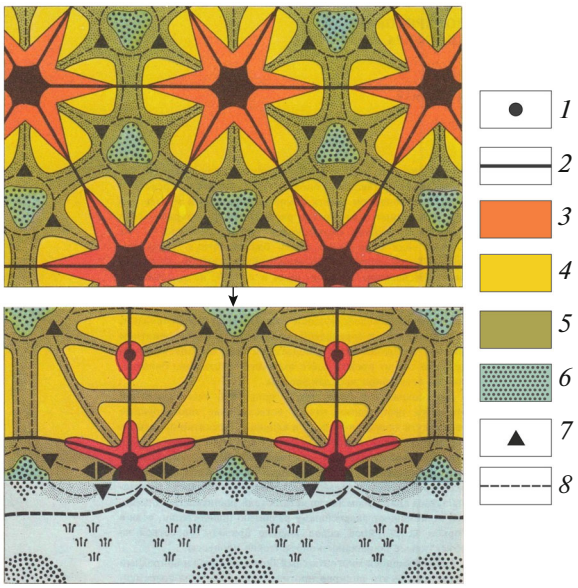

Fig. 1. Basic diagram. Universal network polarized cultural landscape: on homogeneous plain in middle of continent and in coastal parts of land and sea (lake).

On land (top): *1*, city centers; *2*, utilitarian highways; *3*, residential areas with permanent population and environmentally friendly manufacturing industry; *4*, agriculture of high and medium intensity; *5*, suburban natural parks for recreation and tourism, extensive agriculture (natural hayfields, pastures, agro-recreational lands), amateur hunting and fishing, forestry; *6*, nature reserves; *7*, recreational settlements and dwellings (dachas, hotels, camp sites); *8*, tourist routes, roads, trails. On water surface (bottom): similar functionalities (including marine plantations and fisheries, swimming and sports areas, utilitarian and recreational voyages), but less likely to be feasible with clear boundaries.

TRANSPORTATION AND THE SETTLEMENT PATTERN IN A POLARIZED LANDSCAPE

Transport is not an auxiliary branch of the economy serving fixed objects, but the kinematic aspect of existence; forms of settlement depend on the methods and means of the movement of people: these are the postulates adopted in the design of the PL.

In my PL, transport of two types is sharply distinguished. The first is *utilitarian*, serving for everyday mandatory movement, when it is required to transport a passenger as soon as possible, and his contact with the environment is optional and minimal. The second is *recreational*, for the pleasure of drivers and/or passengers while driving. In my project, all people live permanently and do necessary work in areas with pedestrian accessibility from public transport stops. In the PL, as a first approximation, there are four zones: (1) a zone of daily existence and permanent residence on a utilitarian transport network; (2) a zone of industrial use of the landscape (in particular, it can be agriculture); (3) a recreational area dominated by the natural landscape; (4) nature reserves, where animals and plants do not live for people, but for themselves, because they have a right to life.

Public transport outside of cities is assumed to be *discrete*, i.e., one in which the embarkation and disembarkation of passengers is possible only at permanent stopping points. With a rather infrequent location, e.g., of railway stations, green spaces uninhabited by people remain between them. With ecophobic *continual* transport, which are cars, wildlife crossings are necessary to preserve the natural landscape. To restore the Moscow nature park Losiny Ostrov, it is necessary to cover the Moscow Ring Road with a roof and plant a forest on it. Narrow (short) ecobridges will not help:

motorcyclists and crowds of skiers will travel along them.

My public transport differs from private transport in terms of environmental criteria. I do not consider a taxi to be public transport, because the impact of a car on the environment and on all traffic parameters does not depend on who the driver is to the passenger: an employee, friend or relative, family member, or whether they drive for money or for free.

In the PL transport network, all utilitarian roads are topologically radial, i.e., coming from centers of different ranks. From radial roads, a transport network is formed as a lattice, in the ideal case (on the simplest models), triangular–hexagonal or square. There are no circular or chordal utilitarian roads. Conversely, tourist roads, as a rule, can and should be circular, chordal, and diagonal.

Utilitarian passenger traffic between points located even on adjacent radial lines takes place only through the center. Traveling through the center with a transfer in my model is always faster and more comfortable than going straight without a transfer. The vast majority of utilitarian drives require multiple connections, but they are quick and physically as easy as entering an escalator or sidewalk into a low-floor carriage. With such a transport network, green wedges and the integrity of the econet are preserved.

Centralized transport connection was originally borrowed by the author from the situation in Moscow and Moscow Oblast in the Soviet era. This is primarily the metro, where between closely located stations, but at different radii, it was faster to take the metro with one change in the center than to take slow-moving aboveground public transport. In the mid-20th century, a similar provision applied to all of Moscow Oblast. From Mozhaisk to Klin and from Shatura to Kolomna, it was convenient to travel by electric train with a transfer in Moscow. In our time, it would seem, to the point of absurdity, that air traffic is highly centralized. From Orenburg to Volgograd and Kazan, and to any airport in Siberia and Kazakhstan, one needs to fly through Moscow. In Soviet times, snail mail from Chelyabinsk to Sverdlovsk also went through Moscow. With the emergence of new, but, initially, very infrequent networks of even faster ground transport, e.g., maglev trains, such "odd" paths will be constructed by people, and this is taken into account in my models. Why refuse transfers if they are faster?

Let us consider what actually happens to land transport. Motorization completely destroys my diagram. Ring and chordal highways, as well as alternatives of radial highways, finally crush and erase the natural landscape from the face of the Earth. Under the influence of the historically established planning of Old Moscow, officials were seized by a mania for ring roads. They are not satisfied with the overcrowded Moscow Ring Road and the new Central Ring Road, they want to build a backup for the Moscow Ring Road; then there will be nothing left of Losiny Ostrov Park.

To preserve the natural environment, utilitarian transport of people must be public and discrete. A passenger car has the opposite properties. Motorization makes it impossible for the existence of continuous green wedges or indeed any kind of econet. Direct, continuous, and uninterrupted transport links of every point of the Earth's land with every other point is impossible, and the constant and still relentless approach to this absurd situation by constructing more and more highways is destructive for the biosphere. But this is precisely this devastating trend that prevails today.

ISOCHRONOUS MODEL AND MONOCENTRISM

The author's PL assumes an *isochronous model* of a city. It appears rigorously monocentric, and its boundary coincides with the isochronous accessibility availability of the city center for all residents. In this regard, it is necessary to refer to the fundamental work of G.A. Goltz (1981). In agreement with him, I believe that an individual city, and indeed any sufficiently large single settlement, is an area of daily accessibility of some vital objects. It is assumed that a city resident can visit all the places he needs during the day and return home at night. With the same daily rhythm for all humanity, the size and shape of settlements depend on people's means of movement. If they walk only on foot, then the settlement has a compact form, ideally round (on a homogeneous plain without waterbodies). If the main roads are highlighted, allowing a higher speed of movement and attractive for the placement of many objects, then the circle is transformed into *an urbocentric rosette.* The Moscow agglomeration in the mid-20th century was such a rosette, formed by suburban trains. Wooded green wedges remained between the blades of the rosette.

To show the dependence of the outline of the city on the way people move and the possibility of preserving non-urban spaces for green wedges, I built an *isochronous pseudoleaf* (Fig. 2), the model of one petal of an urbocentric rosette.

Two types of transport are used, differing in speed (one main path and many local ones), and walking. For roads of different ranks, the *optimal abutment angles* (the concept itself is "open" when skiing, when exiting unblemished snow-covered land onto a good ski track). Complete monocentrism and complete isolation of the area from the external environment are quite strong, but compared to reality, these are fantastic assumptions. This is the only mathematical model in my "theoretical geography." Substituting different methods and rates of movement into the pseudoleaf, we get various forms of plant leaves. The leaf is the transport system, a fan-shaped nodal district (Fig. 3).

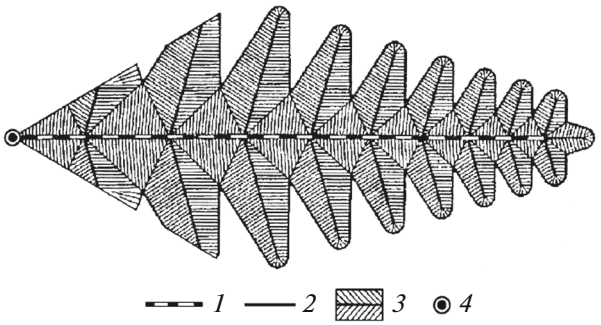

Fig. 2. Isochronous pseudoleaf (Rodoman, 1999b, p. 91). *1*, Radial highway (first-order road); *2*, subradials (second-order roads) and border of area (border isochron); *3*, third-order connecting routes (including fastest off-road passes), boundaries of sector and subareas; *4*, center of area.

The applicability of this model outside of geography is probable.

The orange serrations and petals in Fig. 1 are hypostases of an isochronous pseudoleaf; they are not calculated, but drawn according to the artist's imagination. The six-pointed stars are explained by the dense packing of circles on the plane (each circle is in contact with six neighboring ones). The triangular–hexagonal network of roads and settlements on a homogeneous plain is the most natural and forms spontaneously; such was the network of unpaved country roads in Central Russia until the mid-20th century. The rectangular network is more artificial, but it also forms semispontaneously when short local roads adjoin the main ones, short lanes adjoin long streets, and many roads adjoin banks and other landscape-forming lines. The source of rectangularity in the cultural landscape is the rectangular (in plan view) shapes of houses and land plots. In the rectangular variant, all elements of the PL are preserved and remain topologically unchanged (see the lower, seaside, part of Fig. 1).

The isochronous model of the city, as soon as it was born, immediately started to become obsolete. A single town surrounded by a sparsely built-up countryside is already a rarity these days. Agglomerations of cities (and nonurban settlements) are common, and agglomerates of agglomerations—megalopolises—are not uncommon. The actual (physical) boundaries of settlements are elusive. The criteria for distinguishing urban settlements from nonurban are also unclear: isn't this a relic of feudalism, when different settlements had different legal statuses? Monocentric settlement structures that developed around fortresses, castles, palaces, estates, temples, markets, and factories are becoming a thing of the past. How will this affect my monocentric diagrams?

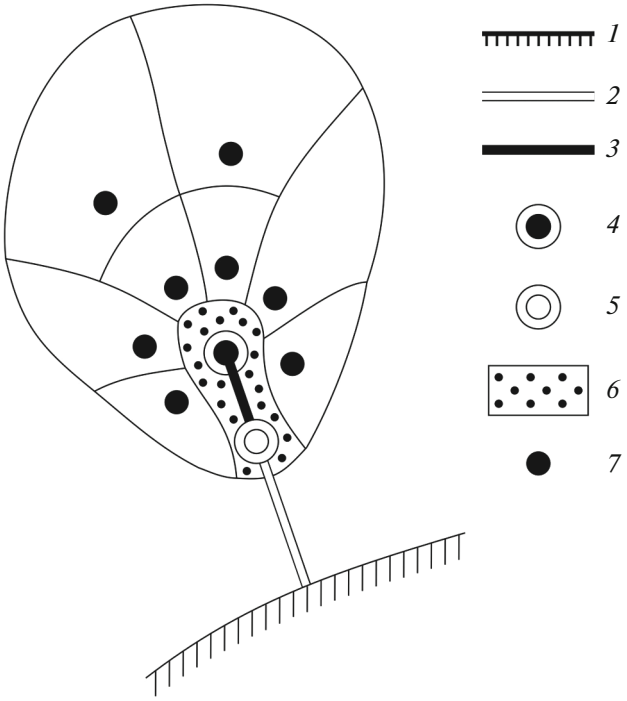

Fig. 3. Fan-shaped node area (Rodoman, 1999b, p. 156). *1*, Base; *2*, stem; *3*, center channel; *4*, center of region; *5*, forecenter; *6*, core; *7*, centers of subdistricts.

CONDITIONAL UNIFORMITY AND DISCRETENESS

Differently colored areas on the baseline diagram of the PL (see Fig. 1) are *conventionally homogeneous typological districts*. The representation of their homogeneity is a product of mental generalization. In fact and on a larger scale, they can be depicted as complex territorial complexes containing many or even all of the PB zones. In the orange area of conditionally continuous urban development, there are green zones of parks and squares, and in the yellow zone of intensive agriculture, their centers are in the form of settlements and green corridors, at least in the role of forest conservation belts. In other words, the color of an area shows not just one function, but the predominant one.

The number of PB functional zones is also not predetermined: it can be of any type. All zones can be divided into subzones by the degree of urbanization and strictness of the environmental regime. My cartoids show the minimum number of zones sufficient for a visual demonstration of the idea.

Should the boundaries of functional zones be or are, in nature or in the imagination, sharp or gradual? Apparently, both are possible. My methodological choice is discreteness, and this is no accident. My *discrete–hierarchical* idea of the world was formed under the influence of Soviet administrative-territorial division. But, I think, not only mine was. In the grandiose multistage individual physical and geographical

regionalization of the world, Soviet geographers delineated natural countries, regions, provinces, and districts.

Regionalization in my understanding is discrete mapping of the environment that can be continuous and/or discrete to varying degrees. Discretization is necessary for understanding, and, in particular, verbalization: linking a vague mass of things and phenomena to words (concepts, terms), as well as for decision-making. Regionalization is a way of conquering space (*divide et impera*) (Rodoman, 2018). The roles of periodization with respect to time are similar, and the role of classification, to a set of things (Rodoman, 2007, p. 212).

In the postindustrial era, in the era of postmodernism, in the atmosphere of postscience and other fashionable "postisms," all these arguments may seem naive, primitive, and obsolete. Let us consider the PB as an object of the history of Russian science, the geography that developed in the Soviet Union in the mid-20th century.

SOFTENING OF CONTRASTS AND BUFFER ZONES

My PB is a *functional zoning* to protect vulnerable landscape components from aggressive ones; all my zones, except for the extreme (polar) ones, are *buffer* protective zones, to prevent or mitigate a harmful neighborhood. In my model, a skyscraper cannot stand next to a natural lake and a natural forest: between them must be intermediate zones of low-rise buildings and a recreational park. But what do we see today? Advertising offers just such a devilish neighborhood of new buildings with a park and nature reserve; residential complexes are embedded in woodlands. Protected zones of natural and cultural sites are not respected.

At the same time, there are experiences of successful coexistence of urban infrastructure with wild flora and fauna. Such is, e.g., Wetland Park in Hong Kong, surrounded by skyscrapers not only of this city, but also of the neighboring, much larger Shenzhen. The area of reclamation of wasteland and swamps now looks like wild nature and has become a wintering place and an important waystation for migratory birds.

This means that everything depends on people's behavior. If aggressive components (people, cars, buildings, structures) become more ecophilic, then they can be allowed to approach less protected, vulnerable creatures. It turns out that the minimum allowable size of the range of zones is inversely proportional to the height of the ecological cultural level (we will accept this statement not as an exact mathematical formula, but as a metaphor). The ecological profile, reflecting the degree of urbanization, should not contain cliffs or promontories; in order to avoid collapse, the angle of repose must be observed.

ETHICAL BARRIERS AND FILTERS

When residing in different spaces, the same people behave differently. The craving for a more wild, archaic, less civilized lifestyle is an important component of outdoor recreation. Recreational behavior compensates for the defectiveness of the everyday urban lifestyle and makes up for the lack of desired roles and activities. This is taken into account in my projects. The functional zones of the PL are areas for the different behavior of people, with different roles. Invisible spiritual clothing is replacing urban clothing along with hiking tourist gear, a new, more sacred attitude towards nature. Moving from the urban to the natural pole, man becomes deurbanized and ruralized. He discovers in himself and embarks on roles, actions, sensations inherent, as seems to him, to other professions and estates, other ethnic groups, and his ancestors.

The boundaries of the functional zones, in my opinion, are mechanical and *ethical filters*, in which personalities, roles, and things are eliminated. Seemingly overly restrictive environmental regulations and rules are the tip of the iceberg; its underwater part consists of numerous prohibitions that we observe all our lives out of habit; in fact, we recognize but rarely remember them. The biosphere is not a landed property, not a workshop, not a people's farm, but a dwelling place for many living things. Man is not the master of other animals, but their *responsible cohabitor.* For comfortable contemplation of beautiful landscapes and communication with animals and plants, landscape natural parks are needed; however, in true reserves, mass visitors have nothing to do. Untouched, unvisited, un-built-up, unsold land, even from a primitive economic viewpoint, is the essence of treasures, the value of which is constantly growing.

INCENTIVES, MANAGEMENT, AND ACCOMMODATION

In the PB, the symbiosis between humans and animals and plants should be based on medical and biological standards and the postulates of humanism and common sense. Therefore, the following main tools for stimulating and managing the activities of people are suitable.

(1) Education from childhood. Traveling, hiking, and manual labor "in the bosom of nature" should become an obligatory part of universal primary education. Alas, environmental education at school leaves much to be desired. Active and creative tourism has not been introduced into education.

(2) Mass media represent the main tools for rapid reeducation of adults and have shown their strength and reach in two areas: (a) political propaganda under authoritarian regimes; (b) advertising in a market economy. In the hands of the state, social and service media could be used for good, but they fail to suffi-

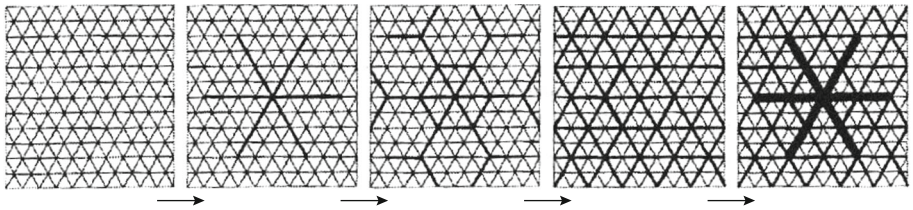

Fig. 4. Cycle of evolution of transport networks (Rodoman, 1999b, p. 165).

ciently utilize their potential for environmental and humanistic education, and in many respects have turned into a large-scale tool for dumbing-down the world.

(3) Landscape planning to attract and distract. This is borrowed from architects. The presence of a variety of buildings and structures and their location are able to directly influence people. A bench invites one to sit down, a lake invites one to swim; convenient paths, squares, and picnic gazebos eliminate the need to break forest canopy or struggle through wind-slashed trees. After the privatization of the 1990s, Russian architects abandoned their humanistic mission and rushed to serve private clients, neglecting public spaces. In the last decade, landscape architecture is still returning to squares and streets; public spaces are being developed.

(4) *Transport policy* as the ecophilic organization of all types of people's movement. This is the most important and specific tool for organizing the biosphere in my concepts, the least known, not properly understood and unappreciated. However, there is no intelligible transport policy, just as this concept itself is unknown. Many problems have been recognized (Vuchic, 2011), the renaissance of public rail and girder transport is beginning, but cars and highways are still destroying the biosphere.

Traditional economic thought now and then recalls the advantages and the need for the full and equal use and distribution of spatial and temporal resources. I take the opposite view. Almost the entire population and all human activities should be concentrated in centers, transport hubs, and at the entrances to fan-shaped nodal districts (see Fig. 3), and decrease with distance from them, just like air density and atmospheric pressure decrease with altitude. The isostatic concentration of the population in giant cities is necessary for the restoration and preservation of the natural landscape cover with its fauna and flora.

RELATIVE INACCESSIBILITY AND INTERNAL PERIPHERY

From personal experience of a long life in Russia, I came to the conclusion that the main, if not the only reliable way of preserving the natural landscape was and remains its *poor transport accessibility*. In the Soviet Union in the mid-20th century, very few families owned private cars and there was a severe lack of decent roads. But what kind of inaccessibility can we talk about these days, when the network of paved roads has become denser and there are off-road vehicles, snowmobiles, and helicopters?

To protect a particular tract of land from disruption and disturbance by masses of people, we need not so much an absolute as *relative inaccessibility*, so that travel and passage would or seemed to be much slower, longer, difficult, expensive, unprestigious, unknown, uninteresting in comparison with the satisfaction of similar migration requirement in places that are more urban, central, metropolitan, and comfortable. Of course, we must first of all refrain from building new highways that dissect and crush the landscape. However, the common artificial deterioration of the transport situation, seeming to the common man as malicious, is not necessary for nature conservation.

Relative inaccessibility arises not from regression of transport, but from its progress. It appears when a new transport network is superimposed on a dense network of old roads: it is faster, but, at first, very sparse (Fig. 4). This experiment has already been carried out in Russia's history, and we should not ignore it.

Until about the end of the 19th century, the territory of European Russia was more isotropic than now. In the summer, against the backdrop of the notorious off-road with terrible muddy roads, freight traffic was somehow supported by barges and boats even on small rivers, but winter was the real season for commercial transport and trade. When a sparse but powerful network of railways was superimposed on the endlessly dense network of winter sled tracks, cities and villages, which were far from railway stations, immediately began to lag behind in their development and fell into decay, partly continuing to this day. The Russian rural outback was not saved by motorization: the horse, only partly replaced by machines (not for driving, but for field work), was expropriated and exterminated as a *kulak* animal, and the roads with cars and buses did not have time to reach a dying village. In the cells of the sparse rail and road transport network, what we now call *intraperipheral* (Rodoman, 2002, p. 79), or *inner periphery*, evolved (Kagansky, 2012; Rodoman, 2012).

The conserved blue-green cores of the natural landscape on the PL scheme are the inner periphery of

the country, region, and microdistrict. To revitalize and make an econet out of any part of a territory, *intra-peripherization* is desirable, reducing its geographical position to the status of the inner periphery. This is achieved not by voluntaristic force against the countryside, but by further concentration of the population in large urban agglomerations connected by high-speed transport.

Socially and economically "decaying" places do not need compulsory secondary development; they can be returned to nature. This is what happens in the forest and conditionally forest-steppe zones of European Russia, on which my PL concept was based. On the scale of the entire ecumene, most of Russia is seen as an internal or external periphery suitable for wildlife conservation (Rodoman, 2016).

It seems to me that "relative inaccessibility" is the most exotic aspect of PL; this phenomenon/concept has not yet been mastered and appreciated by anyone. Could it really be a powerful tool for conservation in our time?

NATURE WITHIN THE CITY

In my writings, the words "nature" and "nature conservation" are used as if everyone knows their exact meaning and as if I myself know what they are. I have made no attempts to clarify them. The equivalence of the urban and natural poles of the biosphere is postulated. They are equal for me, because I like them equally. But do my colleagues, and indeed the rest of humanity, share these sympathies?

However, I myself am not sure that I really love wildlife. I am 100% an urban citizen; I have been a prisoner in an apartment in a multistorey building all my life. My contacts with wild nature have been very short-term and limited; my romantic and mostly distant love for it was not backed up by the painstaking work of a researcher, field worker, naturalist, or, at least, a fairly long life in the role of a Robinson Crusoe type.

In the PL model, the environment intermediate between the urban and natural poles is poorly expressed: the countryside, although in my other works it is considered. When I was young, I did not like the Russian countryside, but nostalgically, I fell in love with it as a kind of cultural landscape at the end of the 20th century, when it was already disappearing in its entirety (Rodoman, 2015).

The concept of equivalence of nature and the city is supplemented and even replaced by the concept of equality. On the baseline drawing of the PL (see Fig. 1), cities are surrounded by a natural landscape, and specially protected natural areas (SPNA) are surrounded by cities; i.e., from the topological point of view, they are fairly located. However, if we look at the utilitarian transport network, it turns out that nature is dissected and entangled by it. Active (city) and passive (nature) partners are not the same; the city actually acts as a predator, and nature as prey. SPNAs held captive by cities are no longer a nature reserve, but a zoo, if not a menagerie, then a prison for animals that are physically and mentally ill. Protected and conserved nature is similar to an accused person for whom the prosecutor selected a lawyer. A reserve, if its identified and scientifically normalized natural state is constantly disturbed and with great difficulty is restored and maintained by people, it is an anthropogenic, artificial object, like a city.

Fig. 5. Boris Borisovich Rodoman, 1975.

In the 1970s, I thought that preservation of the biosphere was necessary primarily for people themselves to survive. Subsequently, under the influence of Ukrainian ecologist V.E. Boreiko, I was inclined towards a more radical viewpoint: animals and plants have a right to life regardless of people's interests (Boreiko, 2002). I do not respect consumer love for nature; I am skeptical about ecological tourism.

HOMO SOVETICUS ET POSTSOVETICUS

The inhabitant of the PL—*Homo soveticus*—one might say, is "ennobled and made happy by B.B. Rodoman." Ennobled in the sense that such good, obviously not base needs, as communication with nature and active tourism, are attributed to him. Made happy in the sense that special areas—functional zones—are provided for his healthy lifestyle.

The author's attitude to his hero is ambivalent, contradictory, and paradoxical (Fig. 5). Somewhere I identified myself with the "Soviet common man," and somewhere I stood over him as a demiurge. In my mind, I felt like an architect who would like to, but could not, live in a beautiful palace designed by him for a rich man; but he does not plan to live in a microdistrict intended for the "common people."

The "average worker" that I have adopted as a standard works five days a week, and during the day stays in an institution or enterprise for eight hours. He

reaches his place of work by transport, almost always public, spending about an hour or even an hour and a half on the road (one way). The rest of the time is considered free, or leisure. Leisure is different: (1) everyday, in the evening, after a working day; (2) at the end of the week, on weekends; 3) annual, on vacation. The mechanical theory of recreation corresponded to this rule: a person loses strength at work and recovers during leisure. The worker does not fully rest in the evening; fatigue continues to accumulate, most of it he eliminates on weekends, but ultimately, the rest is removed only during vacation. Hence, there are two types of recreational commuting, near weekly and long distance annual.

Engineers and architects who design housing, transport, and other services for the population, as well as the officials who supervise them, usually do not use these benefits themselves. The designer of a residential neighborhood hardly dreams of living in one of his small apartments. The mayor of a city who opens a new metro or tram line, will ride it one stop in the presence of journalists, but will not use it in everyday life. Wasn't I in a similar position when designing the PL? Probably and partly. After all, I myself, mentally imitating engineers and architects, did not lead a lifestyle typical of average workers, but, as it were, put myself above them. I did not use sites and devices for stationary rest and program-procedural recovery; I did not rush off to retreats and sanatoriums. I was only doing what I loved and therefore had no distinction between work and leisure.

At the same time, in PB projects, my desire to preserve for myself the landscape in which I spent my youth is significant, and I feel my belonging to the subculture of Soviet hiking. The imaginary objects of my concerns looked like Muscovites of my social stratum, but more connected with work. They, like me, did not have a car or a dacha, they loved walks, hikes, and travel, and despised stationary rest.

By the end of the Soviet period, most urban families in Russia had garden plots in the countryside, which were increasingly used as places for secondary, summer housing. In my PL, this type of land use and settlement was ignored, although many pages have been devoted to its criticism in my journal articles. My negative attitude towards garden partnerships did not mean that I denied all the usefulness of their lifestyle and activities. I objected to the wrong, ecophobic placement of new settlements—on elements of the ecological backbone—forest glades, floodplains, and even on drained swamps. Collective farms, state farms, and forest farms willingly dispensed with the inconvenient lands that prevented implementation of the plan, but such a vicious placement, caused by the peculiarities of the Soviet command-administrative system, was inherited in the post-Soviet period by new cottage settlements.

In my opinion, the suburban settlements of townspeople should develop on the basis of existing or recently vanished rural settlements, continuing and developing their street-road network and block structure. In fact, all this cottage and dacha construction destroyed the traditional rural landscape and dissected and interrupted all hiking and skiing tourist routes.

My PB is a pulsating field of commuter travel (Rodoman, 1999, p. 65; 2002, p. 31). My projects involved very high mobility of people who permanently live in multistorey buildings. Communing with nature was assumed not so much as stationary—at dachas and beaches—as mobile, i.e., hiking and traveling. Thanks to high-speed transport, the sphere of everyday accessibility eventually included not only its own urban agglomeration, its own megalopolis, but also individual points on different sides of the globe (without the inner periphery allocated to wildlife). However, today I no longer feel like such a zealous supporter of residents concentrating in giant cities and buildings. My attitude to tourism has also changed, becoming ambiguous.

In 1970, tourism of all kinds in all countries seemed to be an absolutely positive phenomenon, a noble occupation, physically and spiritually healing and uplifting; but it doesn't seem like that today. Excessive tourism destroys the natural landscape and urban environment, many attractions, and all cultural heritage.

The sharp division of utilitarian and recreational activities, work and free time, permanent and temporary residences is characteristic of the industrial era, dominated by hired labor, office workers in particular. These days, telecommuting should lead to a significant decrease in daily commuting. In modern Russia, security guards are in great demand in the form of daily shifts, alternating with three days off, often filled with productive labor in the household and in the shadow sector of the commodity economy.

The daily mobility of people has also gone too far. Daily routine labor and household commuting has become a heavy burden for humans and the biosphere. These are obviated in different ways: remote work at computers, exchange of jobs, daily shifts, overnight stays in offices and workshops, etc. The COVID-19 helped the rapid and massive implementation of a new order that was rarely practiced before.

If such important phenomena and corresponding fundamental concepts as labor, employment, workplace, working hours, permanent residence, etc., are becoming rapidly eroded and meaningless before our eyes, then what about the territorial areas based on these things?

NATURE CONSERVATION AND PRIVATE PROPERTY

If the PL is a landscape planning program, then under what social and economic systems is it possible? Nature conservation and ecological landscape planning are hardly compatible with currently existing system in Russia. The idea of the PB was born in the Soviet Union in 1970, when there was no question of another social system. Probably what is needed is some kind of "socialism with a human face," unburdened by corruption and militarism, or a Scandinavian-type social state, in which ordinary people live without painful anguish and constant complaints and curses, without expectation that someone from the outside and from above will improve their life.

I am opposed to unlimited private land ownership. If property is a thick bundle of rights and obligations, then it is better to unpack this concept and consider its elements separately, deciding what can or cannot be done in each case. In my opinion, the permissible degree of privacy in owning a land plot should depend on its position in the natural landscape. The most private and autonomous in relation to the state and its laws can be compact land plots of a certain size range, located on nearly horizontal areas, on gentle, slightly convex slopes, at a sufficient distance from watersheds and thalwegs. Watersheds, hilltops, and thalwegs, all natural extreme points and landscape lineaments, should be publicly owned at various levels. This is especially true for the hydronetwork. Small streams can be under municipal ownership; small rivers with their floodplains, under regional ownership; the midreaches of large rivers, under state ownership (in Russia, federal ownership), etc.; Lake Baikal, the World Ocean, and Antarctida would be under international control.

From the ecological aspect, any division between competing owners, owners and users of land, the biosphere, and natural resources is undesirable, because it leads to their destruction. Objects of the land cadaster should be small morphological units of the natural landscape, e.g., *facies* according to N.A. Solntsev (Morfologicheskie ..., 1962), and the degree of their privatization should be determined by their position on the hydrogeomorphological profile, or, the near-equivalent, on the landscape–geochemical profile of A.I. Perelman (1961).

PROJECT, PREDICTION, OR FACT?

In Russia, the ecophilic PL is not only a utopian project, like the garden city of E. Howard (1911), but also a vast reality. *Revitalization* of the landscape is taking place in the Russian hinterland, i.e., in the inner periphery: the fields are overgrown with forest and wild animals are returning. Administrative boundaries are spontaneously turning into an *econet*: they are becoming desirable green corridors. This is an important feature of Russia absent in Western Europe.

Spontaneous landscape revitalization is a fragile phenomenon; it needs people's support and can be easily destroyed by government measures, e.g., village revitalization programs or administrative-territorial division reform. In Russia, fortunately for the animal world, it is still very conservative, without significant changes in some regions since 1943, but this will not last forever.

I seize upon the thesis of V.L. Kagansky, that the cultural landscape of Russia is the result of not of interaction between nature and society, but between nature and the state. Kagansky (2009) states that our landscape is not natural–cultural, but natural–state, more precisely, *natural–imperial*. I would add that nature is not only a victim of the state, but also a just avenger (natural disasters) (Rodoman, 2005).

PERSONAL ASPECTS AND PORTRAIT OF MOSCOW OBLAST

Nowadays, it is fashionable to talk about the personal nature of even the exact sciences based on objective research: some important conclusions and theories turn out to be closely related to the biography of the scientist. But in the humanities and philosophy, this is not a novelty, but the rule. Many teachings and political regimes are products of the childhoods and the personal lives of their authors and leaders.

As a child, I drew multipointed stars and colored their outlines, as well as black-and-white maps in the Small Soviet Encyclopedia. The origins of my *contour-background* painting were drawings by Walt Disney in the book *The Three Little Pigs* (1937). As an artist, I did not rise above the level of a three-year-old who had mastered coloring, but at this level I moved laterally and created my own style of images.

The PB claims to be universal and global, but it has grown on a very small, albeit very significant, area of the Earth's land. This is a portrait of Moscow Oblast, and with further detailing, its western sector; then, the interradial sector between the Riga and Leningrad railway lines (Rodoman, 2002, p. 40). The Great Malino-Anikeevka Ski Route stretched across the sector[2] (Fig. 6). The prototype of the bisector is the Pyatnitskoe Highway as recreational. By the way, one of the drawings that complement the general diagram shows a river, and it seems to me like the Istra!

The closest connection of the PL to Moscow Oblast is obvious. It seems to me that such a diagram could not have been born in the head of even a resident of St. Petersburg, not to mention Krasnoyarsk, Irkutsk, and Orenburg, because around these cities there is no such dense and complete network of radial

[2] This route was very popular among Muscovites in the second half of the 20th century.

Fig. 6. B.B. Rodoman and students of Faculty of Geography, Moscow State University, Borovsky district, Moscow Oblast, 1975.

roads. The PL is in many ways a picture of Moscow Oblast lost to us. This is not only about the many hectares occupied by garden partnerships and cottage settlements. Opportunities for a ramified econet within urban agglomerations have been lost; natural areas are fatally dissected by highways. The entire post-Soviet period is characterized by the destruction of lineaments—transport corridors, potential channels for the movement of things and information; greedy and petty seizure and development of lanes, driveways, and tracks of dismantled railways.

Even Moscow in 1960, within the newly built Moscow Ring Road, could still be enriched with a network of green diameters, rings, and wedges. The corresponding schematic map was lost in my archives, but a verbal listing of the elements of the desired green network has been published (Rodoman, 2002, pp. 216–217).

In my acquaintance with the globe, a certain paradox comes to light. In Soviet times, I traveled all over the Soviet Union, except for Northeastern Siberia, and in the post-Soviet years I visited several dozen foreign countries. Therefore, it is assumed that, at least bit by bit, I learned something from each trip for theoretical geography. But my PB and my theoretical geography to the strongest extent reflect only Central Russia and Moscow Oblast. Siberia is not visible in my diagrams, let alone the southern Russia and the Caucasus in their entirety. As an excuse, I will say that with large-scale research, perception, and monitoring, a single observer can cover only a small region that is constantly and repeatedly visited. Only at a key site can space and time be connected. Therefore, in discussing the landscape and urban environment, I was unable to go far beyond the boundaries of Moscow and Central Russia.

If a parascientific concept or social project by its origin is so limited locally, temporally and personally, then isn't this some kind of soap bubble that should burst after the author and his immediate students and followers leave?

For me, a consolation is comparison with Johann von Thünen, whom Karl Marx, not being a geographer like Thünen himself, seriously underestimated. Thünen interested him as a political economist, and the Mecklenburg landowner really did not introduce anything fundamentally new into the study of differential rent. However, even Marx, in all his greatness, could not foresee either the formation of ideas about structural isomorphism (identity of structure without identity of elements of content), or the emergence and development of theoretical geography in the 20th century. The quasi-Thünen model proved universal, although only more than a century later.

As is well-known, Thünen rings are one of the sources of the PB. In my network PL, at least two quasi-Thünen models are connected and transformed: *urbocentric* (around city centers) and *naturocentric* (around the cores of nature reserves). The presence of Thünen genes in the PB genome inspires a timid hope that my model will be just as tenacious, productive, and multifaceted.

THE POLARIZED BIOSPHERE AND CITY OF THE FUTURE

At the end of the 1940s, as a teenager, I dreamed of eliminating the housing crisis in Moscow: it would be good to build one giant house per million inhabitants, in the style of Stalin's skyscrapers, including the never-built Palace of Soviets, dissected and multiturreted, on Sukin Swamp (the right side of Volgogradsky Prospekt, before reaching Tekstilshchiki station—where the Lenin Komsomol Automobile Plant, now Renault, was located).

New food for imagination was given to me by acquaintance with Paolo Soleri project, published in the journal *America*. Another interesting project was described in the journal *Science and Life*. Then I obtained Michel Ragon's book *Cities of the Future* (1969). The first diagram of my PB contained cities of the future.

The volumetric–spatial line of the PB did not die out, but was transformed into a new concept: "Urbanization is analogous to the evolution of vegetation." Skyscrapers grow upward, are connected by bridges, branch, and their roots grow together through underground links. The profile diagram depicting this has been preserved (Rodoman, 2002, p. 65). I have already seen such a trend in the development of skyscrapers in Kuala Lumpur, Hong Kong, and Macau.

As one can see, my ideas about the PB were at first not only two-, but also three-dimensional, and the lateral view was also used for the image—a profile. My diagrams are not only cartoids, but also *profiloids*.

THE POLARIZED BIOSPHERE IN POPULAR SCIENCE JOURNALS

My PB became widely known in a narrow circle of professional geographers owing to publications in scientific journals and collections, but initially it was intended for a popular science journal. When at the end of February 1970, while skiing in Losiny Ostrov, I experienced this insight, I dreamed of gracing the cover of the journal *Znanie–Sila*. And an article about the PB appeared there, for the first time in 1973—not my article, but an interview with A.D. Armand conducted by T.A. Chekhovskaya "Geography: Three paradoxes of the present day," circulation 500 000 (Geografia ..., 1973). There was already my main cartoid, reworked by artists, and 1500 characters were devoted to describing my model. This part of the text, delivered in the words of A.D. Armand, was entirely written by me at his request. So it was in this form, at least. The first full publication of my article "The Polarized Biosphere" in a popular science edition was in 1975 (Rodoman, 1975). It was the yearbook *Earth and People*, which appeared in *Geografgiz* Publishing in 1957.

In the fall of 1981, an evening student who took to my lectures on science at the Geological Faculty of Moscow State University said that she had connections in the journal *Yunyi Naturalist*. I wrote an article on the PB, "Where do bears live?" My answer was simple: "In the bear corners!" From that point on, the junction points of three administrative regions were called this. The old expression has become a scientific term for me (no joke!). Especially for young readers, I drew a new, simplified version of the basic diagram of the PL. The urbocentric rosettes were not angular, but rounded, like flowers. The girl took the article to the editorial office of the magazine, but I received no response.

The second popular science journal that published my PB concept (Rodoman, 1982), also in multicolored form, was the Estonian journal *Eesti loodus* (Estonian Nature).

In the last quarter of the 20th century, I myself worked for some time as a freelance correspondent for *Znanie–Sila*, and in 1992 my article on PB was finally published there. This turned out to be pale in the literal and figurative sense of the word: the diagram is small and dull, the text is permeated with reservations and doubts, and the title is dismal, "Buried Utopia or Prediction That Came True?" (Rodoman, 1992). Someone even reproached me for renouncing my project. I made no such renouncement, but doubts have increased. The world has changed beyond recognition in 20 years. Optimistic futurism was no longer in vogue.

AS A CONCLUSION?

My PB is not inscribed in the world English-language science community, nor it is not known abroad, just as my entire "theoretical geography." In Soviet times, several of my articles were translated and published in the United States in the journal *Soviet Geography* (e.g., Rodoman, 1968, 1983), but the PB is not among them. The most important features of the Russian cultural landscape on which my projects are based (anisotropy of space, the ecological potential of administrative borders, etc.) are also not reflected in foreign science. Lastly, I am concerned with the material landscape, not with its images and interpretations. I am a naive realist and a troglodyte of positivism, but it seems to have gone out of fashion.

My theoretical and conceptual–constructive geography requires a combination of a quasi-mathematical approach with some kind of opposite artistic imagination. I myself cannot explain or evaluate my method of thinking, and I have no one to convey it to. I would hope that someday there will be a researcher who will read all my works and discover me anew, and maybe write a dissertation about me.

I received "outwardly honorable" recognition, but without real insight into my diagrams, without the desired understanding for me. It suffices to leaf through my monograph (1999), look only at the figures and index of terms, to draw a sad conclusion: the overwhelming majority of my concepts have not been picked up or developed by anyone. But if my concept does not sink into oblivion and will be developed by someone, it means that we are ready for its most inconceivable and terrible interpretations, transformations, and perversions.

The index to my monograph *Territorial Areas and Networks* (1999) contains about a thousand terms. It is a solid foundation for an encyclopedic dictionary. I made a draft of a short illustrated dictionary and published it on the Internet with a test portion of about 75 terms (2017). For each concept, one can write a term paper and thesis, a large scientific article, and even a monograph. And every detail of my drawings—cartoids, every stroke and bend of a line—is also a question and subject for discussion, a problem and challenge for scientific thought. This would be a real development of my models.

My work is not scientific by modern standards. This is a paradox, because I myself gave lectures on the science of science and wrote articles in defense of pure science, the evaluation of which I value very much. "There is no other way of life in science besides the one presented in the article by B.B. Rodoman" (1999a), wrote Academician of the Russian Academy of Sciences G.I. Abelev (1999, p. 38). However, maybe, "the image of a scientist, with such nostalgia and reliability, is presented in the article by B.B. Rodoman" (Abelev, 1999, p. 38), because it is so dear to me that I myself was far from being in line with

him? I did not research anything because I did not ask questions or seek answers; I have not undertaken the trips and journeys typical of a geographer precisely in order to learn something. I merely wanted to see something new and at the same time I involuntarily generalized what I had randomly noticed. My speculative and intuitive ideas do not lend themselves to verification and falsification, I do not even really understand the meaning of these words.

If my works are not inscribed in world science and do not correspond to national standards, then what have I created and who should I consider myself? I am the author of some texts in Russian and some drawings, verbalized images, closely related to these texts.

Let us look again at the basic diagram of the network PL, the most complex and beautiful of my cartoids. Even if one des not understand its meaning at all, it is remembered as a beautiful geometric ornament. All of it consists of one small translational element, placed many times and at different angles. If I had my own house, I would have paved the floor with these tiles. Perhaps someone will be engaged in the manufacture of such mosaics and will patent this business, and I, who did not secure my rights in any way, will be happily forgotten, like most real creators.

ACKNOWLEDGMENTS

I am grateful to senior researcher Ksenia Averkieva of the Institute of Geography, Russian Academy of Sciences, for her great assistance in preparing this version of the essay.

CONFLICT OF INTEREST

The author declares no conflict of interest.

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