

STUDIES ON NATURAL CONDITIONS OF THE DISTRIBUTION OF POPULATION AND SETTLEMENT¹

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The paper presents concepts, methods and conclusions of the research on the natural condition of distribution and development of population and settlement that have been carried out at the Department of Regional Geography at the University of Warsaw. Among other things they have shown a concept of index of differentiation of natural environment, position of physico-geographical boundary, and settlement barriers, and, in the end, prospects for further investigation.

Key terms: population and settlement density, settlement barrier, differentiation of natural environment, physico-geographical boundary, equidistant.

INTRODUCTION

Human activity is strongly conditional upon geographical location and the features of natural environment. The essence of the studies mentioned consisted of confirmation of existence of coincidence among the studied elements of appropriate relations. Among many kinds of relationships which may be examined, geographers' attention concentrates foremost on spatial relationships because this aspect of the examined phenomena is situated in the centre of interest of their discipline. Therefore, studies on these relations have been for a long time one of the main subjects of geographical research. Consequently, this influences are in the community of geographers commonly known and referred to in all handbooks on human geography. Unfortunately, the work in this domain has become a rarity [*Gocłowski*, 1988].

Continuation of research of these problems is justified and needed because of a long-year tradition of such studies in the field of geography and abundance of works on the matter, as well as increasing tendency to conduct the interdisciplinary research. Moreover, these studies respond to the social demand which appears in connection with the globalisation of human civilisation activity and its increasing pressure on Nature.

One of the important parts of this research are studies on natural conditions of the distribution of population and settlement. That problem has been studied along two lines: *historical-geographical* - mostly by historians as a part of the methodology of the humanities and the *anthropogeographical*, which after the time of prosperity at the turn of the 19th century, began to decline, and, at present, is almost completely abandoned. It was, among others, because one of the weakness of the anthropogeographical research was the use of the measurable research methods to insufficient degree and, because in these

¹ This article is a synthetic set on results of investigations conducted since 1970. at the Department of Regional Geography (University of Warsaw) under the leadership of Professor Bolesław Dumanowski and is based on materials published by the members of a team of the Department.

investigations we usually deal with complex relationships which stem from the impact of many factors [Gołowski, 1997].

Therefore, in research practice we are most often obliged to apply simplification procedures as well as those which abstract from complex reality (simplifying and limiting the number of the analyzed connections).

1. HISTORICAL-GEOGRAPHICAL CONCEPT OF SETTLEMENT BORDERS

In the first line, one may discuss more profoundly a concept of "settlement borders"¹

A settlement border is, in the approach presented here, a gradient belt within the spatially expressed settlement features, appearing usually in the peripheral areas of the most dense and oldest settled territories within the given perimeter [Gołowski, 1988].

The primary, "hydro-morphological" version of this concept appeared in Poland already at the turn of the 18th century. The significance of all the other components of Nature in formation of the settlement border was analysed much later.

These analyses indicated that each of the components of Nature can in definite conditions and at definite time points take on the leading role. Thus, for instance, K. Godłowski (1983) states that pre-historical settlement clusters in Polish territories were divided by the belts of desolate areas characterized by such features as boggy and marshy terrains, water-divided locations, poor quality of soils (mainly light), soils heavy to cultivate (e.g. silts), etc. [op. cit.].

Hence, settlement borders are such belts in which natural conditions influence clearly disadvantageously the settlement process.² Thus, these borders stop human expansion directed towards them from the adjacent human settlement clusters. This phenomenon is reflected in a rapid decrease of settlement density along the borders and appearance of accompanying phenomena, such as changes of types of settlements, dimension of centres, etc.

The border belt, with low population density, may either divide two highly populated areas or one highly populated area from another one in which settlement density is low or which is completely desolate. Together with population development in the vicinity of the border belts, the tendency of settlement towards breaking through the borders increases. Many border belts play their barrier role only temporarily, that is, when population "saturation" of an area considered is, as a whole, relatively low. When, however, the process of diffusion of settlement to less populated areas proceeds sufficiently effectively, the borders get gradually less and less visible to disappear finally.

¹ The term „anthropogeographic border" was introduced and first used in Poland by S. Lenczewicz in 1935 and then developed by J. Haliczzer (1939 and 1959, under the name Staszewski). A similar concept, in this paper under the name "settlement border" has been for a long time a basis for performing delimitation of the settlement and political areas in pre-historical and medieval history studies. This concept inspired also M. Janiszewski (1959) and A. Piskozub (1968) in their work on subdivision of Poland into geographic-historical regions. It is also from this concept that most probably originated determination of the co-called anthropo-limits J. Tyszkiewicz (1975), applied in historical geography [Gołowski, 1988].

² It should be noted here that relative and absolute settlement borders ought to be well distinguished. It is only the former type of borders that is considered here. Absolute borders form outer limits of the biological oikoumene of man, and therefore they appear in extreme natural conditions (desert, high mountains etc.).

When starting to define settlement borders on a map one can first determine these features of the Nature within a given area which in the light of studies carried out so far appear as playing the role of “barriers” to the settlement development process. Certainly, for each period and for each settlement type the analysis of these barriers will give different results.

Further, the image thus obtained should be complemented with distribution of settlement, and particular consideration of these features which allow grasping of change gradient sought.

The analysis of the map ultimately obtained should make it possible to determine the settlement gradient conditioned by the Nature (or at least spatially correlated with changes of environmental conditions) and to eliminate those anthropogenic origins is doubtless.

Thereby, it is possible to establish the cartographic image of relations studied. Now it becomes necessary to explain this image on the basis of source materials concerning the origin and evolution, both of the natural environment conditions and of the settlement system.

As can be concluded from what has been said, the fundamental weakness of this method is the necessity of reconstruction of the past natural conditions and settlement configuration within the whole of the space considered which sometimes forces a scientist to make extrapolations on the basis of, obviously, incomplete data, and which opens up a possibility of introduction of excessive subjectivity. On the other hand, however, one can never be sure of having identified all the motives and barriers essential for shaping the settlement process, either of the objective (natural and social) or of the subjective (e.g. psychological) origin.

Thus, by application of the “border method” one cannot obtain a complete and faithful image of the really existing relations either [Gołowski, op. cit.].

2. CONCEPT ON THE ROLE OF DIFFERENTIATION OF NATURAL ENVIRONMENT

At the end of the 60s of XX c. at University of Warsaw (B. Dumanowski and his team) the cartometrical and statistical studies on the problems of natural conditions of population and settlement which were based on the methodology of natural science were undertaken.

An important issue in the research is the choice of factors most significant to the examined phenomenon. Of great importance is an in-depth familiarity with the examined phenomena and researcher’s intuition. In applying the simplified procedures, we consciously renounce the possibility of obtaining a full picture of the examined relationships because factors which have not been taken under consideration in the analysis may modify them, sometimes in a significant manner [Walewski, 2006].

In Dumanowski and Plit basic paper (1985) the differentiation of natural environment can be utilized as a synthetic index for the investigation of the relationships between the Nature and Man. Attempt was made at verifications of the hypothesis on the example of the African continent. A positive effect of that differentiation of natural conditions on the intensity of manifestation of human activities in the light of currently prevailing views seems to be indisputable but previous studies on that problem only very rarely have used

measurable methods (see, for example, Semple 1911, Taylor 1951, Janiszewski 1968, 1973, 1982, 1991, Dumanowski 1968, Seibert 1978).

The hypothesis of Dumanowski and Plit is based on the following assumptions:

- “the phenomena that have been observed in maps, of co-existence of differentiation of environment and concentration of population;
- view held in literature, expressed by various specialists, that the differentiated environment encourages the development of culture;
- on the logical assumption according to which in the situation when one of the two interrelated phenomena undergoes change, this usually entails change within the other phenomenon” [Dumanowski and Plit, op. cit., 40].

The method is based on drawing up maps of differentiation of respective elements of the natural environment (geology, relief, climate, surface waters, soils and vegetation) constituting the basis for drawing up a synthetic map of differentiation of the natural environment. Studying these interrelations requires adequate research tools. Several methods to be used in examining these relations: a visual analysis, chi-square test, class difference method, correlation methods, regression analysis, etc.

The comparison between the differentiation of the natural environment and population density made by Dumanowski indicates that regions of a more diversified environment are in general more densely populated than the less diversified ones. However, regardless of the possibility of occurrence of various disturbances caused by other, including supernatural factors, a lack of positive correlation between the two phenomena may result from some mechanisms in the Nature itself which have not been identified so far and which operate contrary to the above-mentioned regularities.

One of them is the problem of the occurrence of limitations in differentiation of natural conditions advantageous to man, which has been barely outlined in literature. No wonder, that in the result of further research (e.g. Gocłowski, 1993, Lechowicz, 2004, and some of the M.Sc. dissertations theses wrote in the Department¹) this regularity is not always confirmed in the particular cases [Gocłowski, 1992].

For instance, investigations in the Crimean Peninsula and the Ukrainian Carpathians largely confirmed hypothesis regarding the important role of territorial diversification of natural environment for not only location but continuity of towns as well (from the time of their rise to the present day). However, the maximum level of this diversification is not optimal for location and continuity of towns. The highest density and continuity of urban settlements are found in the belts of average territorial diversification of natural conditions [Gocłowski, 1993; Lechowicz, op. cit.].

What may be the reason of that deviation?

It may be, among other things, that along with the growing diversity of Nature, there increases a probability of appearance of limitations (also natural but unknown exactly) of

¹ In the Department about two hundred Master's theses on these problems have been written. All that has constituted a sort of experimental range in the research of the Team, where the new approaches and methods were tested regarding various areas and the degree of generalization and scales of the source maps used for research.

human activity which gradually reduces a positive influence of differentiation on social development, sometimes leading to predominance of an adverse tendency, that is the “effect of repelling” of man by various natural conditions.

This hypothesis implies that there may be a clearly defined (limited) level of differentiation of the Nature which is optimal for human activity in the particular conditions. This level does not have to (though it may) be identical with the maximum differentiation.

But how to find out such a “level of optimum differentiation” if it would have to be changeable in time and space by assumption, i.a. dependent on cultural context?

It seems that no clear answer can be found at present. Yet we can try to verify this hypothesis using the models of mechanisms that are active in the Nature and have already been verified by other research disciplines.

This may be the direction suggested by E. Kantowicz (1981) of using an ecological concept of “limiting factors” originating from Liebig’s “law of the minimum”. It holds that the life of organisms is determined by one of those indispensable environmental factors which is currently “most scarce” (that is the “limiting factor”).

However, this mechanism may have a universal range comprising, for example, environmental conditioning of human settlement activity. For instance, it allows us to explain the universal phenomenon that in the mountains the areas which particularly sought and utilized by man are usually the least differentiated areas in respect of natural conditions, such as, for example, plain bottoms of the valleys, lower and less steep parts of mountain slopes and flat surfaces of taluses. Being relatively small, no doubt these areas are exceptionally rare; thus they are scarce in the given mountain area.

Thus as regards territory, they are the “limiting factors” for human activity in the Nature. This reminds us of E. Ch. Semple’s (1911) rightful remark who held that the uniform character of the Nature happens to be advantageous for man in places where small plains are surrounded by vast and highly differentiated areas. But if the vast territories are uniform, social development is restrained in them.

This may be illustrated by a number of various regional examples. Suffice to recall that on the vast monotonous plains any (even slight) disturbances of landscape homogeneity (e.g. slopes of valleys, edges of terraces, dunes, cave-in lakes etc.) are usually a great attraction to settlement. A typical example of such conditions is the location of villages within the old glacial areas of North-Eastern Poland in the vicinity of Białowieża [Gocłowski, 1992, fig. 1].

Thus broadened concept of limiting factors treats any “environmental deficits” as potential barriers to social development, while the “surpluses” – even though they concern the advantageous aspects of the Nature (e.g. large areas of good soil) – do not have to exert such an influence on man’s activity as it might be expected due to their size and intensity.

A univocal functioning of the concept of limiting factors is complicated in ecology due to the so-called “law of interrelationship” which often supplements this concept. To put it simply, this law says that the organisms – so far as it is feasible and advantageous for them – use those elements of the system which are in surplus to replace alimentary shortages [Umiński 1974].

An interpretation of this law seems to be – also in geography – not only feasible but also promising. This may be illustrated by the following attempt at an analysis of the effect of natural conditions on density of ancient Greek settlements on the Kerch Peninsula [Gołowski, op. cit., fig. 2].

This territory has the greatest density of the ancient Greek settlement over the entire Northern Black Sea area. But quite severe and continental climatic conditions of the Kerch environs are far from being optimum for the Greek who had been accustomed to Mediterranean climate. A large number of towns in this area is a conspicuous anomaly even in terms of the entire "Great Greece" because Great Colonization had usually occupied areas of Mediterranean climate.

In the effect, it was impossible to develop on the Kerch Peninsula a typical Greek economy such as was prevalent, for example, in Crimea in the vicinity of Khersones (impossibility to cultivate many xerophilous plant, poor harvest of some others, absence of breeding of donkeys and mules, complete changes in construction and attire because of winter colds etc.). Instead, the Greeks could make use in this area of a wide range of other economic possibilities resulting from different natural conditions (including climate) and from their contacts with the neighboring barbarian tribes. Those were transport location on the strait between the two seas, on the main trade route from Asia to Europe, the vicinity of the vast chernozem steppes that supplied wheat and were excellent for cattle grazing, abundance of fish and close neighborhood of the regions where the best slaves of ancient world could be found (Scythia, Caucasus).

Thus we observe the replacement of the element of the shortage (appropriate climatic condition, too little sweet water) by the "surplus" elements. In this particular case, they were such a powerful development incentive that they led to the rise of the greatest concentration of towns on the Northern coast of the Black Sea.

All in all, the essence of the advantageous (optimum) differentiation of natural conditions for human activity is not so much its range (or intensity) as its structure, that is mutual proportions of natural elements, as well as their characteristics and relationship within in given geo-complex.

Thus it would be best for man to have such a structure of natural conditions as would create a full, and "harmonious" set of elements from the viewpoint of the needs of the given type of culture. If our suppositions are true (which seems highly probable), this "harmony of the Nature" would be the most important natural foundation for social development. Unfortunately, the current state of knowledge of the relations under investigation precludes a rapid verification of these suppositions [Gołowski, op. cit.].

3. CONCEPT ON THE ROLE OF PHYSICO-GEOGRAPHICAL BOUNDARIES

Another concept in our investigation links to the special place of physico-geographical boundaries.

The question of influence on the levels of human activity in the neighbourhood of these boundaries was taken up in Poland after the World War II by Janiszewski (1968, 1973, 1982, 1991), Dumanowski (1968, 1974), Kantowicz (1985), Gołowski (1984, 1986, 1993) and Lechowicz (2000, 2004).

According to Ernst Neef (1980), an outstanding scholar studying problems of physico-geographical regionalization, boundary belts between particular physico-geographical units (in rough estimate=ecosystems) constitute location of especially intensive exchange of matter and energy. It is there that the principal natural processes characterizing the whole of the units bounded focus, their intensity being the highest just in these frontier belts. As a result, both the belts themselves and certain parts of the adjacent geo-units undergo continuously intensive transformations, including structural ones [op. cit.].

These processes, existing prior to human activity, constituted probably, besides significant spatial differentiation of natural conditions within the boundary belts, the basic impetus for particular activation of man in the neighbourhood of these belts. There is no doubt, therefore, that in the belts of physico-geographical boundaries there goes on an exceptionally intensive exchange of energy and matter between the environmental conditions and the human activity, with information flow playing a particular role in this exchange. It may also be hypothesized that more intensive settlement processes in these areas are to a significant degree related to the heightened dynamics of Nature within them.

Thus, the Neef's approach, addressing the matter-energy movement within the boundary belts, can be generalized to encompass the system of higher level, namely, "physico-geographical boundaries and settlement", treating it as specific natural-social system.

Model of a similar approach called "eco-social system" was presented for the purpose of archaeological research by Clarke (1972, in: *Kozłowski J. K. & S. K. Kozłowski, 1983*). Such a model ought to be thereafter tested against concrete, possibly differentiated examples of physico-geographic boundary belts.

The socio-cultural subsystem encompasses a number of elements whose alternative distinction should also depend upon the purposes of research. It seems, though, that a potential effort at evaluation of the elements of this subsystem is presently bound to fail in view of great complexity and complication of connections within the subsystem. It can therefore be assumed that it is possible to conduct, first of all, the considerations on the character and functioning on natural linkages between the two subsystems, treated largely (especially socio-cultural subsystem) as "black boxes". That is why recognition of deeper-layer of these relations will ultimately be possible only after the internal structures and relations within each of the macro-system segments are better identified.

Within the framework of existing study capacities one can refer to an interesting concept of Clarke (op. cit.), who introduced the notion of internal equilibrium of the natural-cultural macro-system, of dynamic character:

$$E \rightleftharpoons k(S),$$

where E denotes the Nature subsystem, and S - the socio-cultural ones.

As can be seen, the imminent feature of such an equilibrium is its instability. Thus, it can be concluded that disruption of any of the relations between the segments of the macro-system entails a change of a structure as a whole. The formula, therefore, illustrates well the mechanisms of interrelations between humankind and Nature and explains the

essence of difficulties which appear more and more frequently as the aggression of man towards Nature increases.

All and all, the concept presented above gives only quite a simplified approximation of essence of actually existing relations and at present there appears a need for explaining the mechanisms at work, and determining more precise limitations on applicability of methods used [Gołowski, 1988; idem, 1990].

Our investigation of the relation that exists between physico-geographical boundaries and settlements based on the use of equidistant measurements on both sides of such boundaries. Within the reach of the established equidistance measurements are taken of the quantities and values of interest such as e.g. number of settlements, their density, etc.

The physico-geographical boundaries of separate elements of the natural environment are assumed from maps covering such component elements, as the type and the number of separations being suited to fit our research. Accordingly, we are choosing first of all boundaries that represent in themselves striking gradients between areas separated, and also such as seem to influence settlements for some other reasons as well. Thus, for instance, when pondering geological boundaries, lithological criterion will weight more than a stratigraphic one.

Such a choice cannot, undoubtedly, lack a flavour of some bias, but it is hardly to be avoided in geography as such. What remains to be done under these circumstances is to follow only one's common sense with the awareness of errors and falsifications likely to result from such a method of approach.

While assuming thus modified boundaries, we are freeing ourselves from the hardships of their delineation. It does not free ourselves, by any means, from the need of considering the very essence of natural boundaries, as regards their spatial and time-related mutability in particular.

Physico-geographical boundaries exert pronounced impact on their surroundings within a specified, pretty wide belt (see e.g. Neef, op. cit.) thus giving as if a rise to a characteristic belt of influences. We think that a similar sort of interaction is also taking place between boundaries themselves and the anthropogenic phenomena, thus advancing territorially far beyond the map-established lines being actually nothing else but only the truly existing belt-to-belt delineation confines. That is why examining the ties human settlement may have with the physico-geographical boundaries, by means of an equidistant belt, is logically self-evident.

The width of such a belt, say, will largely depend on the actual scale of maps employed, on the accuracy of delineation and density of the boundary lines, etc. It has little in common with the belt boundary whose width is, in addition, continually changing. To adopt such a belt of measurement is moreover advantageous in that all calculations may be referred to the surface area being thus comparable with other areas as well.

While proceeding with the research, an identical initial approach is assumed in regard of each component of the Nature and its boundaries, as if each of them were identically important for the act of settlement. Later on, while basing on possible spatial coincidence of both phenomena under consideration, it will be possible to carry out hierarchy of such boundaries from the viewpoint of part they have been performing for the settling action.

It might seem obvious that, on the whole, the strength with which boundaries affect the settlement ought to be inversely proportional to the distance in which a colonist has built his settlement unit away from the boundary. Accordingly, if we set this phenomenon within a belt of even an arbitrary width, we should, in the majority of all cases, arrive at a confirmation of the postulated ties or bonds. In fact, measurements taken have proved thereafter that the highest density of settlement occurred in those places, where the assumed belts of measurement had been the narrowest. Therefore, indicators depend largely in their level on the width of the test belt.

Another postulate linked with it is that comparable cartographic materials ought to be used and areas of an identical size possibly compared. However, although no direct comparison of concrete values of indicators established for different areas is possible by using belts differing in their widths, it is possible to compare hierarchic position particular boundaries may have for the settlement as indicating only order of succession in which the given type of boundary is listed for such areas hierarchized independently from each other [Gołowski, 1986].

The method presented herein has been temporarily verified against examples of several selected areas¹ resembling each other in their size by using maps of similar scales. These areas differ a lot from one another as regards their natural, social and cultural background. Different width of the test belts have been tried out as well.

Despite differences cited between these areas, there are also striking regularities speaking for the benefit of this method. One can feel everywhere the conspicuous role "fluvial" boundaries are playing in these areas and approximately the same hierarchization of the importance boundaries of particular natural components have in this case. The sequence is as follows:

RIVERS -> RELIEF/LITHOLOGY/VEGETATION -> SOILS/CLIMATE²

Where also villages have been investigated, their ties with the natural boundaries are much less conspicuous than those in the case of towns, which seem to illustrate the town-generating role of the boundaries.

Having grouped the settlement according to the number of boundary belts for various components of the natural environment, passing through the settlement under observation, one can see how many of them are situated close to three or even more boundary belts (Dumanowski 1974, Gołowski 1986). It appears, too, that under all the factors that affect these values much to say has the density of boundaries in each area having been mapped. A tendency should therefore prevail to try to compare materials that resemble each other in this respect.

All in all, the physico-geographical borders favour, in general, the location and evolution of settlement, however the influence of that factor varies much according the regional circumstances. Accordingly, results obtained usually confirm those relations

¹ Armenia, Azerbaijan, Hungary and Czechoslovakia (see *Gołowski*, op. cit.).

² Varying order of succession within the same member.

which are theoretically postulated. This can result both from local perturbations and from appearance of other types of regularities which were either not included in the approach used or have not been known so far.

In the light of considerations so far it seems that despite major methodological hardships it would be worthwhile contemplating the ways of investigating into complex physico-geographical boundaries and into the effect they exert on human activities. It might also be interesting to see how these relations used to change in time and how they tend to accommodate, affected by the current social, economic and cultural circumstances [Gołowski, 1986; idem, 1997].

4. THE IDEA OF FUTURE RESEARCH AND METHODOLOGICAL CONCEPT

Problems related to the role played by physico-geographical boundaries with respect to settlement coincide with the concept of determination of natural spatial boundaries of settlement propagation, called in this paper "settlement borders".

Thus, by application of the "border method" one cannot obtain a complete and reliable image of the really existing relations either. It seems, though, that this situation can be significantly improved if the two methods are used simultaneously. They are namely based upon opposing assumptions and lead to different goals, although they are, in spite of that, quite similar.

The first method, starting with physico-geographical boundaries, that is with spatial differentiation of Nature, considers the studies of relations between their outline and the settlement system within the areas rather more densely populated.

The second method, after having determined the settlement gradient belts, aims at determination of natural conditioning of relative settlement "gaps" or depressions.

Thus, it is obvious that courses of these two types of boundaries not only do not necessarily follow the same outline, but, in fact, quite often diverge from one another.

Hence, from the point of view of capacities for a more complete studying of relations between natural environment and settlement, these two approaches are to a significant degree complementary. Both concern undoubtedly the same macro-system and can be treated via the concept of Neef, mentioned before, since its assumptions refer to the regularities of the matter-energy dynamics which are sufficiently general to allow for the use of this concept not only with regard to natural processes. It is also not without significance that an ultimate outcome of such an integrated study can be synthetically presented in the form of common map, constituting a model of the relations sought in their spatial aspect [Gołowski, 2004; idem, 1988].

The application of the above discussed Nature-Man relationship research methods may cast in a new light on the question of one of the traditional objectives of regional geography which is the delimitation of regions. The different character of relationships between the natural environment and man functioning in this environment would be the criterion for regionalization. It means, that the Man-Nature relations are the essence of that procedure. Therefore, these regions will be functional ones and may be named "regions of Nature-man relationships" [Walewski, 2006].

CONCLUSION

At any rate, it seems evident that a need for complex approach towards natural conditions to be considered in relation to man will grow and comprise an increasing number of fields of human activity. This tendency is favoured - as it seems - by creating model constructions similar to those presented in this paper. But first of all the growing, concrete, socially disadvantageous effects of neglecting the structures and processes of functioning of natural and social - natural systems will compel people to pay more attention to this neglected field.

The author is well aware of the numerous imperfections and drawbacks connected with the methods presented herein. He believes, at the same time, these are nevertheless of some value as an initiation of further research which with time, is likely to produce, much more unbiased and accurate results. But when theoretical and detailed research clearly expands the knowledge of the above-mentioned relations, a need for geographical - or synthetising - approaches of time-related and spatial character should become evident.

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Gocłowski A. Исследования природных обоснований распределения населения и заселения осуществляемые на кафедре региональной географии Варшавского университета. В этой статье обсуждены концепции, методы и результаты исследований, касающиеся природных обоснований распределения и развития заселения и расселения, разработанные работниками кафедры региональной географии Варшавского университета. В частности, указаны концепции барьерного расселения, индекса дифференциации природной среды, роль географических границ и, наконец, перспективы дальнейших исследований.

Ключевые слова: плотность населения и расселения, барьер расселения, дифференциация природной среды, эквидистанта, физикогеографическая граница.

Gocłowski A. Дослідження природних обґрунтувань розподілу населення і заселення що здійснюються на кафедрі регіональної географії Варшавського університету. У цій статті обговорені концепції, методи і результати досліджень, що стосуються природних обґрунтувань розподілу і розвитку заселення і розселення, розроблені працівниками кафедри регіональної географії Варшавського університету. Зокрема, зазначені концепції бар'єрного розселення, індексу диференціації природного середовища, роль географічних границь і, нарешті, перспективи подальших досліджень.

Ключові слова: щільність населення і розселення, бар'єр розселення, диференціація природного середовища, еквідистанта, фізикогеографічна границя.

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