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CONCEPTS AND TERMS IN LANDSCAPE SCIENCE

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Summary: In this work some consideration will be given to the glossary of "Terminology and Concepts in the Synthesis of Landscape" (F. Snacken,1.985) suggested by the Working Group on Landscape Synthesis in the way of grouping the terms under the following titles: 1) Basic Concepts; 2) Characteristics of Geographical landscape; 3) Classification of geographical landscape and 4) Applied Concepts. On the other hand there will be the suggestion that the glossary ought to be open. Finally some terms will be deleted and some others will be introduced. After that the suggested terms will be explained by means of a plain definition and an explanation of that definition.

Resumen: En el presente trabajo se hacen algunas consideraciones acerca del glosario "Terminología y conceptos en la síntesis del paisaje" (SNACKEN 1.985), propuesto por el "Working Group on Landscape Synthesis", en el sentido de agrupar los términos bajo los títulos: 1) Conceptos básicos; 2) Características del paisaje geográfico; 3) Clasificación del paisaje geográfico y 4) Conceptos aplicados. Por otra parte se propone que el glosario sea abierto. Finalmente se suprimen algunos términos y se introducen otros. Después se pasa a definir los términos propuestos aportando una definición completa y una explicación a esa definición.

Index.

1.- Introduction.

Even though our contribution is contained in the biblio graphy that we will quote, we thought it interesting to work it over again according to the working scheme suggested by the Working Group; since only at the light of the ideas which we present here our suggestions of a new order for the glossary -the introduction of new terms and the cutting out of others- are justified. We order the terms according to the following epigraphs: a) basic concepts. b) Characteristics of geographical landscape. c) Classification of geographical landscape and d) Applied Concepts.

The new terms to be introduced are the following: Geogra phy, geographical landscape, structural level of geography, general law of geography, landscape individual, groupings of landscape individuals and geotype. In our suggestion we have excluded some terms pertaining to other sciences where they have already been defined.

a) Basic Concepts.

Having analysed reports No. 2 (Nice, 1.984) and No. 3 (Dessau, 1.985) from the working Group on Landscape Synthesis (IGU) prepared by F. Snacken, we came to the conclusion that with the title "Terminology and concepts in Landscape Synthesis" it is absolutely necessary to define in the first place the science which the working group of this name investigates: Geography. This seems necessary since art historians, ecologists, urbanists, etc. can talk about landscape synthesis, but we feel that in the case of the "Working Group on Landscape Science" we are dealing with geographers. This in mind we did our work. The contents in the epigraph of basic concepts, after defining geography, seemed necessary to us in order to include the object of this science -the Geographical Landscape (to substitute landscape, which appears in Report No. 3 point 1). Following that we also included the structural level of geography, the general law of geography and the geographical dimension (this one being included in report No. 3 point 29).

b) Characteristics of geographical landscape.

A second group of concepts is composed by the characteristics related to geographical landscape: Elements, individuals, groupings, processes, structure and physionomy (report No. 3 points 14, 20, 24 and 17).

c) Geographical Classification.

Another group entails the concepts which refer to its classification: geographical classification, natural landscape and cultural landscape (report No. 3 points 28'4 and 6). In this block it is absolutely essential to define the unit of classification; which we named Geotype.

d) Applied Concepts.

In report No. 3 there is a block of terms and concepts which refer to questions applied in Landscape science; these are No. 15, 16, 18, 19, 21, 22, 23 and 30. With respect to most of them we do not bring in either definition or comment, since they have not yet been the object of our reflection.

Other Terms.

The definition of the terms "nature", "culture", "environment", "natural risk", "therapeutic approach" and "prognostic approach" (Report No. 3 points 3, 5, 7, 25, 26 and 27) seems to us to belong to other ambits of knowledge but not to geography. Nevertheless it does not seem a bad idea to us to match the meaning of these concepts, so frequently used in common diction, so that they can be used with precision in landscape science.

Exclusions.

Finally in the list suggested in report No. 3 we found a series of terms whose definition, according to our criteria, has to be done by other sciences, even though these terms have a straight relationship to geography as landscape science. Define them ourselves from the point of view of geography would mean an interference with these sciences and on the other hand would not help at all to clarify the scientific language. These are the sciences: Ecology, Landscape Ecology, Geoecology, Human Ecology and Ecosystem. (Report No. 3 points 8,9,10,11 and 12).

We believe that the correct way scientifically is to yield for definitions of these terms wedged in their own sciences, to avoid confusions. On inclusion of these terms into

the glossary it would be necessary to equally include all those related to the different sciences that Geography overlaps with: Geology, Climatology, Botany, Zoology, History, Anthropology, Psychology, etc.

2.- Suggestions.

For all these reasons we suggest that the glossary exclusively refers to terms which are strictly geographical, thus avoiding the inclusion of those terms already mentioned i.e. 3, 5, 7, 8, 9, 10, 11, 12, 25 and 27, from "Report No. 3" (Dessau, 1.985).

In our opinion the glossary ought to be open i.e. at the rate the science of landscape grows it should be open to be increased; always under the condition that the terms which get introduced correspond to geographical concepts.

3.- Glossary.

We suggest the following ordering and composition of the glossary:

a) Basic Concepts.

1.- Geography.
2.- Geographical Landscape.
3.- Landscape Science.
4.- Structural Level of Geography.
5.- General Law of Geography.
6.- Geographical Dimension.

b) Landscape Characteristics.

7.- Landscape Elements.
8.- Landscape Individuals.
9.- Groupings of Landscape Individuals.
10.- Landscape Processes.
11.- Landscape Structure.
12.- Landscape Physiognomy.

c) Landscape Classification.

13.- Geographical Classification.

14.- Geotype.
15.- Natural Landscape.
16.- Cultural Landscape.

d) Applied Concepts.

17.- Landscape Stability.
18.- Landscape Vulnerability.
19.- Landscape Evaluation.
20.- Landscape Management.
21.- Landscape - potential.
22.- Landscape - prognosis.
23.- Landscape - planning.
24.- Landscape protection.

As can be observed, we introduced with respect to Report No. 3 from Dessau the following terms: 1, 4, 5, 8, 9 and 14 (these numbers correspond to our suggestions).

a) Basic Concepts.

1.- Geography.

Definition: "Science which holds as its material object the forms of the surface of the earth, i.e. geographical landscape, and as its formal object - point of view from which the material object is interesting - the reasons that cause and explain the variety of these forms and their distribution." (LOPEZ, S. and LOPEZ, M.L., 1.985, p. 39).

Explanation: The reasons for the varied forms which can be found in the surface of the earth are the relationships which get established between the physico-chemical, biotical and human elements in geosphere. Thus geography begins its work trying to clarify the relationship between the contributed knowledge of these sciences to finalize it studying the result of these relationships in space and time, i.e. studying the manifold present-day forms of the surface of earth.

Geography precisely studies the relationship between the physical, chemical, biotical and human elements; exactly the same relationships form the object of ecology but the difference between one science and another is that geography studies the relationships only in as far as they are the reason

of forms, the object of its studies, whereas ecology studies them for their own sake. One could thus consider ecology as the "Biochemistry" or "Physioloy" of Geography as for as science of landscape is concerned. (LOPEZ, S., 1.985, p.p. 29-30).

2.- Geographical Landscape.

Definition: "Geographical Landscape is the whole of forms which make for the surface of the Globe as results of the interactions produced when the four ambits -litosphere, hydrosphere, atmosphere and biosphere, as well as their interphases- come together" (LOPEZ, S., 1.985, p.p. 25-26).

Explanation: The terms landscape is used in a very general way both in popular language usage as in various sciences; for that reason we define geographical landscape and we make it in a first approach as: "The entirety of forms which make for the surface of the Globe". Understanding by the "entirety of forms" the different and manifold aspects which can be observed from any point, in surface of the continents, as well as in the heights of atmosphere; and understanding as the "surface of the Globe" the space where litosphere, hydrosphere, atmosphere and biosphere get into contact - a space that we call Geosphere or Geographical Space. We want to emphasize two aspects of this concept of geographical landscape:

- The geographical landscape are forms.
- The forms of geographical landscape originate - have their reason - in the interactions which take place in the geosphere.

3.- Landscape Science.

Definition: "The landscape science is the Geography", (LOPEZ, S. and LOPEZ, M.L., 1.985, p. 39).

Explanation: Understanding geographical landscape as the entirety of forms which result from the interactions which are produced when litosphere, hydrosphere, atmosphere and biosphere as well as their interphases get into contact, and also understanding geography as the science which holds as its material objective the forms of the surface of the Earth, i.e.

geographical landscape and as its formal objective -point of view from which the material objective is interesting- the reasons which originate and explain the variety of these forms and its distribution. Understanding these concepts that way, the science of landscape is the science of geograpy. (LOPEZ, S. and LOPEZ, M.L., 1.985, p. 39).

4.- Geography: Structural Level.

Definition: The structural level of a science is determined by the grade of complexity of its elements. The complexity of the landscape elements: Landscape individuals and groupings of the same puts geography in a high level in the structure of science.

Explanation: Margalef with respect to the level of sciences points out: "When a certain type of knowledge wishes to become a science it selects a determined level in the continuum of structure" (...) "Reference to a determined level of structure is valid, because it means that the science in question takes as given by other sciences certain structuring elements and begins its work by trying to clarify the relationships between those parts". (Margalef, 1.980, p.p.3 and 4). Coming from this point of view one understands the high level of Geography as the elements of geographical landscape are the landscape individuals and also the groupings which arise from their relationships. These elements are formed through the interaction of matter energy and life (in all its manifestations) which occur in space and time and mould into a determined form.

For that we are concerned with some truly complex elements which integrate in their functioning physical, chemical, geological, biological, ecological, historical, economical, psychological and social laws. (LOPEZ, S., 1.985, p.p. 28, 29 and 30).

5.- General law of Geography.

Definition or expression: The forms that the surface of the Earth comes up with are the result of functioning which is carried out in discreet entities. (LOPEZ, S. and LOPEZ, M.L. 1.985, p. 25).

Explanation: The reasons which produce the manifold forms of landscape and which explain their distribution in geographical space are -precisely- the relationships and inte-

rrelationships which start when energy, matter and life, in their extremely manifold manifestations as much for quality as for quantity, get into contact in space and time. These interrelationships, which constitute what we can call the functioning of landscape, are shown in the phenomena that can be observed and that end producing peculiar forms. (LOPEZ, S. 1.985 p. 50).

Geography studies forms and functionings, connected by the link of cause effect. Geography is interested in forms, but understands that form is the result of a functioning and defines the functioning as the sum of the various functions or processes between the elements of landscape individuals, organized by a "fuerza rectora" (rectory power) which gives it its entity and its objective delimitation. For that, the general law of geography as the science of landscape states: "The forms of geographical landscape are the result of the functioning of the landscape individuals and their respective groupings". (LOPEZ, S. and LOPEZ, M.L. 1.985).

6.- Geographical Dimension.

Definition: Whichever phenomenon occurs on the surface of the Earth, be in physical, chemical, biological or human, entails geographical dimension.

Explanation: We take it for granted that no matter what phenomenon occuring on the surface of Earth, be it physical, chemical, biological or human, entails geographical dimension, since the organization al or structural level of geography includes all those ambits: "With respect to Geography, we place it in a structural level able to integrate the physical, chemical, geological, biological, ecological, historical, economical and social sciences. For that geography starts its work trying to clarify the relationships amongst knowledge brought in by those sciences, to finish it studying the actual different forms of the Earth surface as well in its diversity (morphology and geosystematics), in its distribution (corology), in its classification (geotaxonomy) as in its groupings (geosyntaxonomy)" (LOPEZ, S., p. 29).

b) Characteristics of Landscape.

7.- Landscape elements.

Definition: The landscape elements are on one hand the

landscape individuals and on the other hand the groupings formed as a result of the established interrelationships between the individuals.

Explanation: By defining geographical landscape as "The entirety of forms that the surface of Earth acquires" and by thinking that these forms are the result of a functioning (see: general law of geography) one has to specify also that every functioning is achieved between discreet magnitudes of matter and energy within limited time and space extensions. This is what Margalef calls, for biology, "Discontinuous blocks of living matter". Margalef, 1.980, p. 6). The functioning of landscape is also achieved between such discreet magnitudes, which here are the landscape individuals. (LOPEZ, S. 1985 p.27) Farthermore interrelationships are established between space-neighbouring landscape individuals which give way to groupings. The grouping is a new organization level, higher to the individual, and whose constitutive elements are the very landscape individuals.

Landscape taken from an analytical point of view is composed of individuals and from a synthetical point of view of groupings of individuals which together with their interrelationships make for a higher level of organization. (LOPEZ, S., 1.985, p.p. 23 and 24).

8.- Landscape Individuals.

Definition: We define the landscape individual as a functional-morphological entity, containing one or more cells (1), composed of elements, factors and phenomena, and established basically by a "fuerza rectora" (rectory power), a determined space and a life span. (LOPEZ, S. and LOPEZ, M.L., p.p. 26 and 27).

Explanation: The functioning is given between the elements of the individual, which are the big constructing realities of landscape: energy, matter, life, space and time. These elements, or some of their manifestations, by determining them in space and time and by setting into relationship the ones to the others, act as factors; the factors in turn with their dynamics originate multiple phenomena, whose consequences create on the surface of Earth the most diversified forms. (LOPEZ, S., 1.985, p. 55).

In the same way that "Life went on diversifying by colonizing the different environments and based this diversifi cation on morphological variations which reflect functional adaptations to the surroundings it found, and it did all this by means of discreet manifestations of the "Life": individual organisms, thereby landscape, a special type of life diversify by means of discreet entities, which are the landscape individuals: each one of them individualizes, precisely, through the organising power that one of its constituing elements acquires over the others. This mentioned element we call "fuerza rectora" (rectory power). The organizing power of the "fuerza rectora" is limited; if this were not so there would have existed and would exist only one landscape individual in geospere: It is limited with respect to space, which it is able to include in its organization, and limited in time that it can hold this power. These limitations point out the time-space dimensions of the landscape individual, as well as the different phases or shades it can undergo: expansion, regression, hegemonial position or loss of potential, etc." (LOPEZ, S., 1.985, p. 36).

On the other hand, the organizing power of the "fuerza rectora" is not to interfere with the own functioning of the other elements but to "select it", by increasing or decreasing it by means of its own functioning. Thus, what the "fuerza rectora" organizes, is the functioning of the individual, and not that of its elements. (LOPEZ, S., 1.985, p. 35).

9.- Groupings of Landscape Individuals.

Definition: The grouping of landscape individuals represents a new type of landscape entities, belonging to a higher organization level as that of the landscape individuals itself.

Explanation: Talking about the groupings of individuals we have to place us at a higher organization level as to the individual one, something parallel to what in botany the plant communities form, or what in linguistics is represented by the sentences or the judgements formed by means of words.

In the same way that for the knowledge of the landscape individual one can make comparisons with the world of biology

(1) We use a parallel biological nomenclature, until a specific landscape-nomenclature will be created.

(vegetal and animal), so for the knowledge of the groupings of individuals one needs the support of comparisons with the rational world laws: historic, sociologic, economic...

In geography as science of landscape two levels are of interest -the individual and the grouping-, but for reasons of methodology one can only reach the second after knowing the first one. (LOPEZ, S., 1.985, p. 24).

10.- Landscape processes.

Definition: The landscape processes are the whole of phenomena originating from the own dynamics of the landscape individual elements (energy, matter, life, space and time), modified by the interactions between the very same individuals.

There are two levels of processes:

- Internal of each entity, which is the functioning of the landscape individual, organized by the "fuerza rectora" (rectory power)(cf. landscape individual and landscape stability).
- External of each entity, which are the relationships between the landscape individuals (cf. landscape structure).

Explanation: Every dynamism materializes under an organization principle which onswers for what is happening there, and each level has got its own principles: the physico-chemical laws in the abiotic and plant world; the instincts on animal level; and free will guided by intelligence in the world of humans. Each higher level includes the preceding ones.

The functioning of the landscape individual is determined by its "fuerza rectora": "that element of the individual which answers at the last request for the functioning and thus for the individual morphology, extension and duration".

Given the structural complexity of geography, the "fuerza rectora" of the individuals may pertain to whichever level, of those integrated in it. (LOPEZ, S., 1.985, p. 33).

11.- Landscape Structure.

Definition: The landscape, from an analytical point of

view, is composed of individuals, and from a synthetical point of view, composed of individuals groupings, which altogether with their interrelationships make for on organization higher level parallel to the plant grouping Studied by the fitosociologists. (LOPEZ, S., and LOPEZ, M.L., 1.985, p. 40).

Explanation: For geography as landscape science both levels are interesting the individual, object of general geography, and the grouping, object of regional geography. Of course, for methodological reasons, one can only reach the second after knowing the first one. (LOPEZ, M.L. and LOPEZ, S., 1.985, p.p. ...).

12.- Landscape Physiognomy.

Definition: This is the appearance or the form directly perceptible by man of either a landscape individual or a individuals grouping, always taking into account that these forms are the result of the individuals functioning aswellas of the relationships amongst them.

Explanation: The diversity and disparity of the "fuerzas rectoras" (powers) and the fact that one and the same "fuerza rectora" can have its effects on clusters of different elements, explains us the diversity and variety of landscape individuals and therefore of their groupings. But at the same time it is possible to observe how landscape individuals and also their groupings repeat themselves sometimes in near-by places, but other times in far-away places. (LOPEZ, S., 1.985, p. 38).

c) Landscape Classification.

13.- Geographical Classification.

Definition: Geographical classification is the classification of landscape individuals (geotaxonomy) and of the groupings of individuals (geosyntaxonomy) which form the geographical landscape. (LOPEZ, S., 1.985, p. 29).

Explanation: Taking into account that we conceived geography as the science of landscapes, for us geographical classification is the classification of the entities which form landscape in its two levels of organization, the individual and the grouping one.

The landscapes classification is a general aspiration of geographers since the beginning of the century, when the German and Russian schools started looking for landscape as the object of geography. (cf. bibliographical study in "Taxonomy of Geographical Landscapes", LOPEZ, S., 1.985).

In the preliminary study of our taxonomic suggestion we found out, how the first problem that impeded geographers from counting on a taxonomical classification, has been the difficulty to distinguish the landscape entity, delimited in an objective and thus universal way. The second problem which made it difficult for geography to count on such a valuable instrument for investigation and knowledge transmission, is the lack of precision in the concept, the object and the level of geography. This resulted in the absence of a general law of the geographical science as a base on which be able to tackle the taxonomical classification of geographical landscapes.

We have suggested that: "The general theory of the geographical science, on the base of which one can tackle the landscapes taxonomy, is to consider the forms of the Earth surface and the distribution of those forms -material objective of geography- as the result of the functioning -formal objective of geography- in discreet entities: landscape individuals." (LOPEZ, S. and LOPEZ, M.L., 1.985, p. 38).

With these two elements: 1) objective and universal landscape individuals, and 2) general law of the geographical science, it is possible to start the classifying of landscapes work at the individual level (geotaxonomy).

14.- Geotype.

Definition: This is the basical geotaxonomical entity and wich we defined as the sum of landscape individuals which show similar and shared functional-morphological characteristics. (LOPEZ, S. and LOPEZ, M.L., 1.985, p. 35).

Explanation: We call geotype the lowest taxonomical category, thinking of the "types" of soils, which pedology has established as base for its classification, because we wish to differentiate it from the biological "species", so closely linked to generation: in landscape individuals generation does not exist. A landscape individual arises when

a determined balance is produced in geosphere. This unstable balance increases the effect of one of the landscape elements, which from then acts as "fuerza rectora" (leading power). In this process there is no generation, but succession, i.e., that balance may vary in space with time. And thus, when the "fuerza rectora" changes, a new individual takes the place of the former, whose structure generally serves as substrate to the new one. Therefore, one can come to the conclusion that there is a landscape individuals succession, which we can call evolutionary if we consider that all landscape individuals have got one common ancestor: the existing landscape in times when the globe had been a big glowing ball. It will be possible to establish the laws this evolutionary succession had followed and follows, when the estudies of geographical landscapes systematics and taxonomy advance. (LOPEZ, S., 1.985, p.p. 174 and 175).

15.- Natural Landscape.

Definition: Natural landscape is -keeping to the most widespread meaning in scientific language and interpreting it in the light of our classification proposed in 1.985- the one formed by landscape individuals or by groupings of landscape individuals whose "fuerzas rectoras" (leading powers) belong to the physical-chemical o biological -plant and animal- ranges.

Explanation: Within our classification (cf. taxonomical classification proposed by LOPEZ, S. and LOPEZ, M.L., 1.985, p.p. 32-38, or LOPEZ, S., 1.985, p.p. 161-206) this term lacks meaning and does not exist actually, since for us man operated landscape is as natural as the one governed by the physical-chemical or biological powers -or, is not human life natural on earth?...- Nevertheless, natural landscape is a term so used in landscape literature that we explain its meaning according to our classification.

16.- Cultural landscape.

Definition: Cultural landscape is -cf. clarification notes in definition and explanation for natural landscape- the one formed by landscape individuals or by groupings of landscape individuals whose "fuerzas rectoras" (leading powers) belong to the human biological range.

Explanation: cf. natural landscape.

17.- Landscape stability.

Definition: The stability is a quality applicable to the landscape individuals as well as to their groupings, which is based on the landscape individuals "fuerzas rectoras" (leading powers) capacity or power to remain as such a leading forces during a period and invade an area, all of it always within the unsteady balance of geosphere.

Explanation: Stability -permanence, duration in time; firmness, security in space (Diccionario de la Lengua Española. Edited by the Real Academia Española, edic. XIX, 1.970)- is the permanence in the interior of a unsteady balance. This concept is not applicable to landscape "sensu lato", since landscape will always exist -if one considers it independently of a given type of landscape-, and yet this concept -stability- is certainly applicable to any given landscape individual or any given of their groupings, which may remain or change according to whether their "fuerzas rectoras" (leading powers) were or not able to maintain their own organization in the middle of the unsteady balance of geosphere.

The landscape individuals's stability is determined by:

a) The "fuerza rectora" (leading power) of each landscape individual.
b) The unsteady balance of geosphere.

18.- Geographical landscape vulnerability.

Definition: Geographical landscape vulnerability is a quality applicable to the landscape individuals as well as to their groupings and which is based on the capacity of being seriously damaged.

Explanation: The landscape individuals are extremely vulnerable because they may be severely damaged by only interfering with any of the numerous processes and relationships which make up their functioning.

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