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Ethnophysiography

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Abstract.

Ethnophysiography is a new term coined by the authors to refer to an ethnosience of landforms. Ethnophysiography seeks to document and compare terms used in various languages and cultures to refer to the natural landscape and its parts, and the meanings of those terms. Ethnophysiography is an important part of efforts to construct ontologies of the geographic domain because the categories of landforms, water bodies, etc. are not clearly differentiated in nature the way terms for kinds of plants and animals typically are. Landscape terms and their meanings appear to subdivide reality differently in different cultures; thus clear definitions of meanings in an ontological framework with universal expressive power are needed if semantic interoperability across languages and cultures is to be achieved.

Keywords. Ethnophysiography, geographic categories, geographic ontology, landscape terms, natural language, cultural differences, ethnography, spatial cognition, geographic information science, geographic information systems, GIS.

Introduction

How do people ordinarily come to understand the natural world? Whether one is a scientist, an educator interested in the relation between formal and informal science education, or a policy-maker concerned with the human dimensions of global change this is a fundamental question. (Medin and Atran, 1999, p. 1)

Medin and Atran go on from that statement to make the case for the importance of plants and animals in human life, and the ways in which experiences with plants and animals may have shaped general aspects of cognition. The landscape, a place to stand, places to live and find resources, is also absolutely essential to human existence, and we believe that it is clear that the landscape needs its own ethnosience. We propose such a field under the term ethnophysiography (Mark and Turk, 2003).

Ethnophysiology is a newly-defined science that seeks to understand and compare the meanings of terms that people from different cultures use to refer to the landscape and its components. Ethnophysiology is motivated by a number of fundamental questions. For example, when people look at a natural landscape, do they see it as filled up with features (objects) such as hill, lakes, and woodlands? Or do they simply see it as a continuous landscape? Perhaps they take an intermediate conceptualization, seeing scattered features over a continuous landscape field? Next, for people who see natural geographic features or objects, are the features determined by the type of landscape? Does everyone see about the same numbers of features, in the same places, with about the same boundaries, and grouped into the same kinds? Or does the identification, delimitation, and classification of landscape features vary across cultures, landscape, languages, or individuals? Third, there are the issues of naming. What things (entities, regions, objects, features, places) in the landscape are available (cognitively) to be named and talked about? Of those things, which get **common** names (that is, things that are considered to belong to **kinds**) (always, sometimes, never), and which get **proper** (individual) names (always, sometimes, never).

Ethnophysiology is a new field of study that examines the categories that people use when conceptualizing and communicating about the landscape. Ethnophysiology is an ethnoscience, similar in its aims and scope to ethnobotany or ethnozoology (Berlin, 1992; Medin and Atran, 1999). It studies how people conceptualize the natural landscape, especially landforms and water bodies. Ethnophysiology relies heavily on ethnography as a method for obtaining information through interviews, description, and community participation. It focuses on kinds of things in the landscape, and aims to document in detail what things in the world are referred to by each term, and why. Ethnophysiology relies strongly on an ontology of physical reality at landscape scales to provide a framework within which the researcher may describe the referents of generic geographic terms and of geographic proper names (toponyms).

The term "ethnophysiology" was coined by Mark and Turk (2003). The "ethno-" part is used to parallel other science of folk categorizations, such as ethnobotany and ethnozoology. The second part of a neologism to refer to this field could have been based on the root "topos", but instead we have chosen "-physiology". The Oxford English Dictionary gives one meaning of physiography as "physical geography", which captures the domain we are studying very well. Mark and Turk realized during their study of landscape terminology among the Yindjibarndi, an aboriginal Australian group, that the research methods that they were employing in that study parallel the methods used in ethnosciences such as ethnobiology (Berlin, 1992; Medin and Atran, 1999). Considering the importance of landscape to culture, it would be surprising if ethnographic methods have not been used to study common-sense categories for landscape elements. Nevertheless, we have been unable to find examples of such work.

Related Terms, Fields, and Concepts

A number of fields are closely related to ethnophysiology. One of the related fields is the study of *toponyms*, the proper names of places or geographic features. Another related field is *topophilia*, a term coined by Yi-fu Tuan to refer to "the affective bond between people and place or setting" (Tuan, 1970, p. 4).

One interesting question for the development of a general theory of toponyms is as follows: Are there two superordinate kinds of things in the landscape, namely places and geographic objects, treated differently in language and thought? J. J. Gibson

(1979, p. 136) stated that places are not objects: "A place is not an object with definite boundaries but a region." Bohner et al. (2002) state that place names are grammatically marked in Yukatek and some other languages, which means that locations relative to places are expressed differently than locations relative to things.

Some Important Differences Between Ethnophysiography and Ethnobiology

The new field of ethnophysiography differs from ethnobiology in more than just subject matter. Medin and Atran (1999, p. 5) clearly describe one of the foundational principles of ethnobiology: scientific categories form a baseline or null hypothesis for the study of folk categories:

Consider how an ethnobiologist would undertake the study of folkbiology in some new culture. The project could hardly get underway without asking what living kinds are found in that culture, what terms exist in the language referring to living kinds, and what the relation is between those terms, and what's there (the issue of reference). How does one describe what living kinds exist in some cultural context? A reasonable starting point is to use scientific taxonomy as a reference or standard, ... scientific taxonomy provides something of a conceptual grid for crosscultural comparisons. (Medin and Atran, 1999, p. 4)

A critical point for ethnophysiography is that natural inorganic domains are not organized by nature into kinds in the same way that biological entities are so organized!¹ Thus ethnophysiography does not have a baseline or grid of categories in the same way that ethnobotany and ethnozoology do. Unlike higher plants and animals, which to some large degree are grouped into species by nature, landforms more properly belong to continua. Water is certainly ontologically distinct from land, but the sizes and shapes of lakes or islands do not naturally fall into discrete categories with absent intermediate cases, in the same way that kinds of trees or birds fall into such groups. This provides both a methodological challenge for ethnophysiography due to the lack of an independently-defined baseline, and also an opportunity for languages, cultures, and individuals to vary much more in their categorization of very similar landscape elements.

To be clear, geomorphology does not provide the baseline. In an earlier experiment (see Smith and Mark, 2001), 29 members of a pool of undergraduate subjects in Buffalo were asked to list examples of "a kind of landform": responses given by 3 or more subjects were (in descending order of frequency) mountain (20), island (12), peninsula (9), hill (8), valley (8), plateau (8), volcano (7), continent (6), canyon (4), lake (4), cliff (3), desert (3), plain (3), and river (3). Very few of these

¹ We can debate ad nauseum the technical philosophical point about whether *any* kinds or types exist in the mid-independent world, or whether all kinds or types are mental concepts—and it appears that the difference is more of a religious issue than a scientific one, depending precisely on what is meant by kinds existing in the mind-independent world. Realism, nominalism, and conceptualism all have had their adherents for hundreds of years. In practice, the point we wish to make about differences between ethnophysiography and ethnobiology rests only on the degree of kindness in the world being much lower for inorganic natural domains than for the biological domains most often studied in ethnosience.

items would be found as examples of landforms in a geomorphology textbook. Although we have not elicited lists of terms from trained geomorphologists, we believe that they would list landform types that result from single processes or with strong process-form feedback, such as deltas, volcanic cones, sand dunes, drumlins, etc. Mark and Smith have discussed these issues in two recent papers on the ontology of landforms (Smith and Mark 2003; Mark and Smith in press). Lacking a set of categories defined by scientific geomorphology as a baseline or grid for evaluating folk categories, ethnophysiology requires a detailed ontological framework for comparing conceptualizations of the landscape to provide the baseline concepts for documenting and differentiating folk categorizations of landforms. This is provided by the COADs approach discussed in the next section.

We are referring to the conceptualization of landscape for any particular cultural/language group as "folk", in line with the common practice in ethnoscience. However, we do not intend by this to necessarily privilege any particular cultural tradition over others. Ethnophysiology respects the beliefs, knowledge, and worldview of each cultural group, while seeking to ground the study of their differences in a structured understanding of physical reality, as revealed and organized through a scientific approach.

Ontology

As originally defined and employed in philosophy, the term "ontology" deals with the nature of reality. Ethnophysiology depends on this kind of ontology to provide a framework within which meanings of folk terms for landscape elements can be defined: concepts such as land and water, boundary, concave and convex, vertical and horizontal, large and small, flowing and still, deep and shallow, permanent and intermittent, etc. At this level of abstraction, the Ontology is an objective, realist account of the true nature of the landscape, and would be universal across human languages and cultures, although some languages or cultures may emphasize some of these universal properties and ignore others.

Ontologies in the information systems sense, on the other hand, are formalizations of conceptualizations, suitable for implementation in information systems. The conceptualization involved could be a philosopher's "ontology" as described above, or it could be an epistemology, a collection of beliefs about the landscape and knowledge of the landscape, possibly containing imaginary or false conceptualizations. In the domain of IS-ontologies, truth, or fidelity to reality, are not really issues—instead, the conceptualizations embedded in the information system must be faithful to the conceptualizations held by the clients or users. IS-ontologies are dominated by terms, organized into taxonomic hierarchies. We introduce a way of dealing with such ontological distinctions via a framework of 'Conceptualizations of a Domain (COADs)' in a companion paper in this workshop (Turk and Mark, submitted).

Ethnophysiology provides methods that can be used to document the concepts and conceptualizations of landscape that must be represented in geographic information systems. Terms discovered, documented, and defined in an ethnographic study can be formalized to produce data dictionaries and other implementable representations. Also, if the terms are defined in terms of primitives provided by the general Ontology of the geographic domain, it should be possible to interoperate between different conceptualizations of the same landscape, or at least to indicate those situations in which the terms from two different languages or cultures do not line up.

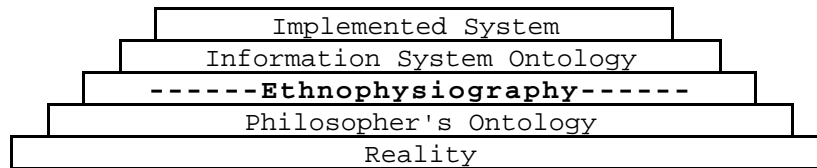


Figure 1: How ethnophysiography relates to different sorts of ontology.

Conclusions

We believe that an ethnoscience of landscape is needed in order to bridge the gap between realist representations of the Earth's surface and its variation on the one hand, and landscape terms in various languages and their meanings on the other. Given the importance of the landscape to human existence, and the number of studies of environmental and geographic cognition, wayfinding, and spatial relations, it is surprising that such a field has not emerged earlier. Ethnoscience in anthropology appears to have concentrated very much on the biological domain, and psychologists studying categories also have focused on biology, or on artifacts, or on abstract domains (cf. Rosch, 1973a, 1973b, 1978). We would not be surprised to find systematic accounts of landscape generics in other cultures in the works of cultural geographers and anthropologists of the Carl Sauer tradition, but thus far we have not uncovered examples of such studies. There is an urgent need to use ethnographic methods to document landscape terms and their meanings for a wide variety of cultures, to provide foundations for cross-cultural and cross-linguistic semantic interoperability for the geographic domain.

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