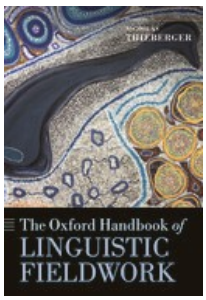

The Oxford Handbook of Linguistic Fieldwork

Nicholas Thieberger (ed.)

https://doi.org/10.1093/oxfordhb/9780199571888.001.0001

Published: 2011 **Online ISBN:** 9780191744112 **Print ISBN:** 9780199571888

CHAPTER

16 Geography: Documenting Terms for Landscape Features

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https://doi.org/10.1093/oxfordhb/9780199571888.013.0017 Pages 368–391

Published: 18 September 2012

Abstract

This article describes the influence of geography in documenting terms for landscape features. Documentation of a language includes investigation of the semantics of terms in the language. The landscape constitutes an important domain of human experience, which is sometimes inadequately covered in language documentation activities. By landscape the article means features such as mountains, rivers, valleys, and forests. Voegelin and Voegelin recognized topography as a fundamental domain for language documentation. It also includes large water and vegetation features in our idea of the landscape domain. Geographic objects tend to have fuzzy or graded boundaries, and there seems to be considerable variability in what gets delimited and how the objects are categorized and named. Another complication is that geographic objects are almost always very large and in fixed locations, hence it is difficult to elicit terms by showing real examples directly. These characteristics of the landscape domain provide the researcher with a number of methodological challenges regarding the elicitation of landscape terms. Since the landscape domain is a key aspect of place, and vice versa, it is an important component of culture and language for all people, especially for those indigenous peoples who have an unbroken intimate association with a particular area of 'country' that has lasted hundreds, perhaps thousands, of generations. However, the nature of landscape means that there is great potential for different types of classification systems to arise within different languages, even in very similar environments. Hence it is not possible to provide a generic template for investigation of landscape terms.

Keywords: geography, landscape features, language documentation, geographic object, topography

Subject: Linguistic Anthropology, Semantics, Linguistics

Series: Oxford Handbooks

Collection: Oxford Handbooks Online

16.1 Introduction[1]

16.1.1 Motivations

Documentation of a language includes investigation of the semantics of terms in the language. The landscape constitutes an important domain of human experience, which is sometimes inadequately covered
p. 369 in language documentation ↳ activities. By landscape, we mean the larger components of the human environment, composed of very large features and places that often can be best perceived and appreciated from a substantial distance (Granö 1997)—features such as mountains, rivers, valleys, and forests. Voegelin and Voegelin (1957) recognized topography as a fundamental domain for language documentation. We also include large water and vegetation features in our idea of the landscape domain.

While such a physiographic definition of landscape is useful as an initial approach to partitioning off a domain of interest, this definition is not unproblematic. It could be seen to not include emotional and cultural attachment to landscapes, landscape features, and places. To incorporate these considerations into the initial definition would involve a lengthy analysis of relevant issues of cultural geography, phenomenology, semiotics, etc., unfeasible in this context; however, the reader should assume that cultural aspects are included, as discussed further below.

For domains such as zoology and botany, scientific taxonomies can provide a clear etic[2] grid against which indigenous methods of categorization can be recorded. Likewise, the Munsell colour chart (Landa and Fairchild 2005; Munsell 1905) provides an etic grid for recording the semantics of colour terms. For the geographic or landscape domain, however, there is no such grid. One of the reasons that the landscape domain does not have an etic grid is the ontology of landscape—much of the variation of the Earth's surface is more or less continuous, and thus the same region of land can be subdivided into nameable landforms and other landscape features in many ways. Also, geographic objects (mountains, hills, rivers, lakes, etc.) tend to have fuzzy or graded boundaries, and there seems to be considerable variability in what gets delimited and how the objects are categorized and named. Another complication is that geographic objects are almost always very large and in fixed locations, hence it is difficult to elicit terms by showing real examples directly. These characteristics of the landscape domain provide the researcher with a number of methodological challenges regarding the elicitation of landscape terms.

There is some logic in collecting toponyms (place names) during the same field procedures used for investigating generic landscape terms, since the relationship between these two ways of referring to landscape features is an important aspect of understanding conceptualizations of place (see Nash and Simpson, Chapter 17 below). However, there are sometimes complications which make such combined objectives difficult to achieve. For instance, generic landscape terms may be considered as not culturally sensitive, whereas access to placename data might be restricted because of disputes over land tenure rights, or for other reasons.

p. 370 16.1.2 The landscape domain

Since the landscape domain is a key aspect of place, and vice versa, it is an important component of culture and language for all people, especially for those indigenous peoples who have an unbroken intimate association with a particular area of ‘country’ that has lasted hundreds, perhaps thousands, of generations. However, as mentioned above, the nature of landscape means that there is great potential for different types of classification systems to arise within different languages, even in very similar environments. Hence it is not possible to provide a generic template for investigation of landscape terms.

One option is to base a general landscape classification scheme on the concept of 'affordance' (Gibson 1966), which refers to the characteristics of an object or an environment that relate to its potential for interaction, in this case human interaction. Affordances are likely to play an important role in landscape categorization; things with similar affordances are more likely to be grouped together into some category. The more important aspects of the affordances of natural landscape with respect to human beings includes the domain of topography (landforms) and hydrology (water in the landscape) and then land cover (vegetation). The aspects of landscape considered include:

1. Topography (landforms)
    - Convexities: eminences
    - Concavities 1: longitudinal depressions in the landscape
    - Concavities 2: oval or round openings in the earth
    - Passes (saddle points)
    - Vertical faces (cliffs)
    - Edges of elevated areas
    - Horizontal areas (plains)
2. Hydrology (water in the landscape)
    - Sources of drinking water
    - Bodies of standing water
    - Watercourses
    - Sources and sinks
    - Confluences
    - Parts of large water bodies
    - Shore-bounded land areas (islands etc.)
3. Land cover (vegetation)
    - Vegetation assemblages
    - Enclaves and refugia

p. 371 This list can serve as a starting point for identifying landscape terms in any particular language, and bears some resemblance to domains recognized by Voegelin and Voegelin (1957). However, the use of this terminology for landforms and hydrology is merely to establish an initial set of categories for tabulating existing dictionary entries for landscape terms. This terminology is not used with the consultants or to describe the terms used in the target language in resulting landscape dictionaries.

It is critical to note that what aspects of landscape are salient for a particular language community depends on their lifestyle, culture, history, and spirituality—their 'lifeworld'. Mohanty (1997: 60) explains this term:

> The lifeworld is a world of **practice** (of action, making and doing) and **praxis** (of social action, of production of goods, and distribution of goods). It would, however, be mistaken to say that these modes of **acting** exhaust the lifeworld in all its dimensions. For example, there are religious, aesthetic, and cultural dimensions. By virtue of these, the world as well as things in the world are presented to subjects inhabiting that world with different sorts of values—as useful, as sacred, as beautiful—all of which can be brought under the general heading 'cultural'.

Affordances can be considered as emergent relations between humans and their physical environment (including landscape). Hence, their categorization (and linguistic terminology) is likely to flow from the everyday actions that the members of any particular language community routinely undertake. Actions determine relationships with our environment, which entail affordances. Heft (2003: 151) puts it thus:

> To experience objects and events of the world most fundamentally as bearing possibilities for our actions, that is, as affordances, is by definition to experience them relationally. Affordances are attributable to the intrinsic properties that features, objects, and events possess by virtue of their makeup, and are delimited or specified in relation to a particular perceiver-actor.

A linguist or ethnographer must therefore seek to understand the lifeworld of the community of speakers of the language in order to determine what sorts of landscape features are likely to have generic terms (or toponyms) and the likely complex sets of meanings that may be attached to individual features or configurations (groups) of landscape elements.

16.1.3 Ethnophysiography

Ethnophysiography is a recently defined field of study that seeks to understand cultural differences in conceptualizations of landscape, via comparisons between the meanings of terms that people from different
p. 372 cultures use to refer to the ↳ landscape and its components (Mark and Turk 2003). Landscape is an interesting topic of study because relationships with land are central to many cultures and landscape features pose problems for classification. The basic ethnophysiography hypothesis may be stated as follows: people from different language groups/cultures have different ways of conceptualizing (or cognizing) landscape, as evidenced by different terminology and ways of talking about, and naming, landscape features.

In any effort to document the semantics of terms within some domain of experience, it can prove useful to consult with experts in the domain itself (e.g. geographers for the landscape domain). In some cases, domain experts may take the lead in a domain-specific project. Domain knowledge is useful to language researchers when they try to understand the referents of terms from that domain. A concentrated effort on a specific topic (subject matter domain) is likely to lead to a more comprehensive coverage and better teasing out of referents and definitions of specific words, in the context of detailed understanding of the language community's lifestyle and worldview, including aspects of spirituality.

This can also be seen as implementing an interdisciplinary or transdisciplinary approach to research, which focuses on a knowledge production process less constrained by discipline boundaries and more in touch with the needs of society (Barry, Born, and Weszkalnys 2008). Turk (2007) recommends a transdisciplinary approach to ethnophysiography which includes accountability to language communities and consideration of indigenous knowledges, and the role of phenomenological as well as realist philosophical positions.

Among the authors of this chapter, Carolyn O'Meara is a linguist with a special interest in the geographic domain. The other authors are from other disciplines (geography; information science; psychology; cognitive science; philosophy; etc.); however, they are collaborating with linguists in their ethnophysiography case studies discussed below. For instance, in the Yindjibarndi study the researchers

have worked very closely with linguists Vicki Webb, from the Roebourne community cultural organization Juluwarlu, Alan Dench (University of Western Australia), and Eleonora Deak and Sue Hanson from the Pilbara Aboriginal Language Centre (Wangka Maya). In addition, the Australian Institute of Aboriginal and Torres Strait Islander Studies provided material from the Aboriginal Studies Electronic Data Archive (ASEDA).

Obtaining detailed information about any aspect of a language is a very long and difficult task. The experience of Gunter Senft (a linguist from the Max Planck Institute for Psycholinguistics—MPI) emphasizes the need for great patience. He reports that having sought landscape terms and toponyms for twenty-three years from his Kilivila native speaker collaborators (on Kaile'una Island, one of the Trobriand Islands in the Milne Bay Province of Papua New Guinea), a group of men approached him one day and asked if he would like to know about landscape words (Senft 2008). He obtained more information on this topic in
p. 373 one session ↳ than during all his previous fieldwork. This also indicates that it is not always easy to obtain words for all language topics, and underlines the virtue of targeted investigations.

16.1.4 Case studies

The methods discussed in this chapter mostly relate to three case studies being carried out by the authors. However, the ideas expressed are also informed by literature and discussions with other researchers active in this field.

The first ethnophysiography case study by Turk, Mark, and Stea is being carried out with the Yindjibarndi people, who are an indigenous (Aboriginal) group living in the state of Western Australia, near the northwestern corner of Australia. Until the nineteenth century, the Yindjibarndi people lived mostly along the middle part of the valley of what Europeans named the Fortescue River, and on adjacent uplands. As part of the European colonization process, Yindjibarndi country was taken over by sheep and cattle stations (ranches) from the 1860s; the Yindjibarndi people were moved off their traditional territory into camps and settlements. Today, most of the Yindjibarndi speakers live in and around Roebourne, in what traditionally was Ngarluma country. Most of the surviving Ngarluma people now speak Yindjibarndi and English in addition to their own language. The Roebourne community is mostly indigenous and people use their own languages and English to differing degrees, depending on the context, sometimes with terms from both languages occurring in the same sentence. Yindjibarndi is a Pama-Nyungan language with about 1,000 remaining speakers, of whom about 500 live in and near Roebourne.

Publications by Mark and Turk (2003) and Mark, Turk, and Stea (2007) present results of the ethnophysiography study of landscape terms and concepts employed by Yindjibarndi-speaking people. A draft photo-illustrated dictionary including about 100 Yindjibarndi landscape terms has been compiled (Turk and Mark 2008). Most of these terms appear to refer to categories that would not be named by a single term in English, and vice versa. For example, if *river* in English makes reference to the riverbed and the water that flows in the riverbed, there is no equivalent term in Yindjibarndi, since riverbeds (*wundu*) and the water that occasionally may flow in those channels are named separately.

The second ethnophysiography case study is with the Navajo people of Arizona, New Mexico, and Utah in the southwestern USA (Mark, Turk, and Stea 2010). The Navajos are reportedly the largest Native American nation in the United States, with about 300,000 members. In 1990, there were about 150,000 speakers of the Navajo language, including about 7,000 monolingual speakers. Considerably more fieldwork and landscape photo response sessions have been carried out with Navajo speakers than we have conducted with
p. 374 Yindjibarndi speakers, but ↳ transcription and analysis of the data lag behind. Conceptual systems for many landscape domains appear to be organized differently in the Navajo language than they are in Yindjibarndi or English. For example, the material from which landforms are composed takes a prominent

role in landscape terms which, in a templatic language such as Navajo, are often complex. However, full details will have to await completion of the transcription and translation phases.

O'Meara is carrying out an ethnophysiography study with the Comcáac (Seri people) who live along the northeastern coast of the Sea of Cortez in Sonora, Mexico (O'Meara and Bohnemeyer 2008). As of 2000, around 800 Seri people (Gordon 2005) lived in two small coastal villages, Socáaix (Punta Chueca) and Haxöl Iihom (El Desemboque del Río San Ignacio). Seri is their first language, but bilingualism is widespread, with Spanish being the second language. The Seri language is considered to be a language isolate. It has been suggested that it is part of the putative Hokan stock (Kroeber 1915), but there is insufficient evidence to prove or disprove this claim (Marlett 2001). Fieldwork was conducted by O'Meara in collaboration with at least twelve native speakers of Seri between 2004 and 2011 in the village of El Desemboque del Río San Ignacio.[3] Data collection procedures included verification and further exploration of dictionary entries in Moser and Marlett (2005), situated route descriptions conducted during expeditions to areas with geographic entities of interest, including foraging trips with Seri women, landscape diagramming in various locations near El Desemboque del Río San Ignacio, lexical relation elicitation, and general participant observation. In cooperation with native speaker collaborators, O'Meara put together an illustrated workbook for children which is designed to elicit responses containing various landscape terms.

Researchers at the Max Planck Institute in Nijmegen have also been active in this field of investigation. MPI's Language and Cognition Group has concluded a set of case studies of landscape terms (and some placenames) in ten languages (including the work with Seri by O'Meara and Bohnemeyer). These case studies cover a wide variety of geographic locations (although most are in tropical regions) (Burenhult 2008a). This work has extended very significantly the range of ethnophysiography case studies and strengthened its linguistic basis. A systematic cross-linguistic comparison of landscape terms in these languages has not yet been conducted.

Twenty-six participants attended an international workshop on Landscape in Language organized by the authors (in collaboration with the MPI researchers) in Arizona and New Mexico in the southwestern USA in October/November 2008. A book summarizing the proceedings has been published (Mark et al. 2011).

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16.2 Field Methods

16.2.1 Methods overview

The methods used by the authors for the three case studies (mentioned above) have varied due to differing physical locations and conditions, numbers of potential native speaker collaborators, etc. However, it is possible to summarize the general method as consisting of the following five stages:

1. dictionary work and photo collection—scoping the domain and preparing ‘instruments’;
2. field interviews—identifying the set of landscape terms and the distinctions, associations and usage;
3. photo interpretation sessions—clarifying existing terms and collecting new ones (except in the Seri case study);
4. semi-structured follow up—clarifying confusions, probing for extra meanings, evaluating quality of interpretations;
5. reporting the initial results back to community members and getting their feedback.

Of course, the actual fieldwork will also be affected by pragmatic considerations and particular techniques may well be used iteratively. For instance, stage 4 could actually be carried out in two parts, the first after stage 2 and the second after stage 3. Also, the field methods discussed here were adopted for a medium-sized study; smaller, single-researcher postgraduate projects may not have the resources to utilize all of these techniques. Of crucial importance is that any method should be used in a reflective manner, with the fieldworkers continually questioning the validity of their results and ensuring ethical practice (see sections below). Our approach resembles a Grounded Theory methodology (Glaser and Strauss 1967).

A summary of the techniques used in the case studies is provided in the following subsections, each representing a 'stage' in the methodology.

16.2.2 Techniques used in stages of method

16.2.2.1 Dictionary work and photo collection

This stage includes scoping the particular linguistic domain and preparing 'instruments' for use in fieldwork. Specific techniques include:

- Review of existing dictionaries (hardcopy and digital) and word lists; e.g. for Yindjibarndi these included: Anderson (1986), Anderson and Thieberger (2003), von Brandenstein (1992), Wordick (1982). For the Navajo study, bilingual Navajo-English dictionaries, principally Young and Morgan (1992), were used; Moser ↳ and Marlett (2005) was used for the Seri project. To compile an initial list of landscape terms for a language, we looked up each term in a long list of English-language landscape terms, in the dictionary of the target language. Also, in one case (Yindjibarndi, in Anderson 1986), the dictionary included 'topic codes' for each term, one of which was 'Geographical features'.

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- Review of existing written stories and audio recordings relevant to landscape; e.g. for Yindjibarndi these included von Brandenstein (1970).

- Compilation of lists of all geographic terms from dictionaries, wordlists, etc. For the sake of establishing a starting point for discussions, these can be classified into semantic groups ('landscape domains') according to the usual meanings of their English equivalents, using groups such as water features, land forms (convex and concave), land cover types, etc (as discussed in §16.1.2). It is important, however, that these initial classifications do not inhibit the researchers from developing a categorization scheme appropriate for the particular language community. The domains are mainly used to help the researchers organize their approach, and are not necessarily a hypothesis regarding how the speakers would group the terms.

- Consultations with linguists familiar with the target language, or at least with closely related languages. This is especially useful to elicit information about the syntax and grammar of the language, for instance, the likely role of parts of speech other than nouns in landscape terms.

- Acquisition of existing images of representative landscape features and/or taking new photographs in the area occupied by the language community and perhaps in adjacent areas.

There are of course also many tasks associated with obtaining background information about the relevant language community (e.g. history, culture, social structures) and its traditional area of habitation (topography, hydrology, land use, etc.). Appropriate procedures must be used to make contact with the community, to ask permission to conduct fieldwork, as well as obtaining relevant ethical clearances in the case of university-based research projects (see Rice, Chapter 18 below). Some of these issues are discussed further in §16.4 below.

16.2.2.2 Field interviews

Field interviews are carried out to identify the set of landscape terms and to clarify their meanings and distinctions, associations, and usage. A variety of different approaches have been used.

An initial approach (used in the Yindjibarndi case study and to a certain extent in the Seri case study) is to discuss the terms collected in the first stage with native speaker collaborators on an individual basis or in
p. 377 pairs or small groups, to see whether the terms are recognized, whether their spellings are correct (if the ↳ language has a standard writing system), and whether there are alternative or additional terms for similar features. Terms may be written on a whiteboard and/or discussed verbally, and the sessions may be audio and/or video recorded. General features of the language and history of contact with linguists, or other ethnographers, might also be discussed in these initial sessions.

It is also possible to interact with collaborators directly in the field. For instance, during fieldwork with Navajo speakers, Mark, Stea, Turk, and Topaha spent several hours with each collaborator in the field phase, driving around in the landscape and encouraging them to talk about the particular features encountered. These field trips were in parts of their territory well known to the individual collaborators (Fig. 16.1). The field interviews were exploratory, and the researchers tried to minimize the degree to which they directed the discussion. During the trip, the collaborators were asked to describe the landscape in their language, with the aid of a translator (usually a family member) if necessary, and in English, and to discuss the names of features. This material was audio recorded and photographs of key features that were discussed were taken as the trip progressed. In most cases, a GPS record of the route and locations was taken. A transcript of
p. 378 the ↳ field trip description is being made, and will be combined with notes taken by the researchers during the trip and with the photographs and locations. This integrated material can then be examined for landscape terms, compared to the term lists from the dictionaries, and used to provide a more informed understanding of landscape concepts of that language group and how ‘generic’ landscape terms relate to proper names used for landscape features. Some of the photographs taken during these field interviews were later used in photo interpretation sessions (§16.6.2.2.3).

Figure 16.1.

Field trip with Navajo collaborators and project consultant, September 2005, at Blue Canyon, Navajo Reservation, Arizona (from left to right, Lorraine Holyan, Andrew Turk, Carmelita Topaha, and Larry King).

We also conducted a more structured field interview with some Yindjibarndi speakers. In some cases we asked them to tell us if they saw an example of some landscape term of interest. At other times we stopped near features and asked the speakers to explain to us what they would call the feature, and why. This semi-structured field interview was conducted fairly late in the Yindjibarndi project, when the researchers already felt they had an adequate understanding of many, but not all, terms. Some photographs taken that day were used later with other speakers, to confirm or refine our understanding of the meanings of terms.

The approach used by O'Meara in her work with the Seri has included a variety of types of field interview. Her primary procedure to elicit landscape terms was conducting situated route descriptions with native speaker collaborators. This approach involves going to a particular location that has some cultural significance to the collaborator (which is determined in advance of the trip)—see Fig. 16.2. Once at that location, the collaborator is asked to provide a route description from the location back to the village. The
p. 379 collaborators are reminded ↳ that they are providing the route description to somebody who speaks Seri, but does not know the area, in order to increase the likelihood that collaborators will use landscape terms and not placenames. The advantage of this technique is that the elicited material reveals the way that landscape features are used as natural landmarks in spatial description. Such specific interview techniques augment data collected from informal conversations with collaborators and observations of people in the community going about their everyday activities.

Figure 16.2.

Native speaker consultant in the Seri project, Maria Luisa Astorga near the mouth of Rio San Ignacio (the major arroyo near El Desemboque).

O'Meara also collected personal narratives which feature the landscape as a central theme—for example, stories about people gathering food items or getting lost at sea. These personal narratives not only provide additional examples of landscape terms in a natural context, but also allow for further insight into the cultural significance of parts of the Seri landscape which are not made clear through participant observation.

Another method that O'Meara has employed is landscape diagramming. This approach involves going to a location where the researcher and the collaborator both have a good view of a predetermined landscape feature, such as a mountain range, dunes, or a stream. At that point, the collaborator draws the landscape feature or scene that she is observing.[4] The researcher then begins to label the drawing according to the collaborator's instructions. This leads to identifying names and terms for parts of landscape features, as well as names and terms for entire landscape features, visible in the scene. This approach also allows the collaborators to direct the elicitation, such that they determine the way the landscape feature is represented in the diagram and they direct the researcher how to label the diagram.

Finally, O'Meara also looked at what kinds of hierarchical relations hold among landscape terms in Seri, if any—in particular, taxonomical (kind-of) and meronymical (part-of) relations. To elicit these lexical relations, two different methods are used. The first is to use linguistic frames for the relations being elicited, beginning with examples from various semantic domains, e.g. ‘a pear is a kind of fruit’; ‘a hawk is a kind of bird’; ‘a pond is a kind of water body’. The other method relies on unilateral entailments to elucidate the lexical relations; e.g. *It's a hawk* unilaterally entails *It's a bird*, suggesting that *hawk* is a hyponym of *bird*.

16.2.2.3 Photo interpretation sessions

For the Yindjibarndi and Navajo case studies, the researchers have made extensive use of photo interpretation sessions. The materials used during these sessions were fixed sets of about forty numbered digital colour photographs of landscape features. For some of the Navajo sessions, the photographs were
p. 380 projected onto a screen or ↳ wall where the speakers and researchers could view and discuss them. For all of the Yindjibarndi sessions and the majority of the Navajo sessions, colour prints (approximately 27 × 20 cm; 11 × 8 inches) of the photographs were shown. Each photo was of a landscape scene, and they were chosen (and ordered) to display a good variety of landscape features, without any recognizable sequence in feature type or location. The order of presentation within each language set remained constant. The photographs were almost always shown to groups of speakers, who then discussed and in some cases debated what landscape terms would be appropriate.

The collaborators were asked to discuss the landscape features displayed in the set of photos, with special reference to the landscape terms that were appropriate, in the indigenous language. The interviews were facilitated by one of the researchers, while the other researchers took notes and made occasional contributions to the dialogue (Fig. 16.3). The sessions were audio taped and in some cases were also recorded on video (Fig. 16.4).

Detailed transcriptions of the audio recordings were undertaken and reviewed by the researchers, with
p. 381 reference to their notes and existing dictionaries. In some ↳ cases these transcripts were also reviewed by linguists (e.g. in the Yindjibarndi case study, at the culture/language organizations Juluwarlu and Wangka Maya).

Figure 16.3.

Navajo collaborators discussing landscape photos at the Sanostee Chapter House, Navajo Reservation, New Mexico, August 17 2006.

Figure 16.4.

Juluwarlu staff videotaping interview with Yindjibarndi elder Ned Cheedy at Jirndawurrunha, Western Australia.

Another approach used is to ask a collaborator, individually, to sort photographs into groups, either an unspecified number of groups, or, often, three groups (triadic sort). Collaborators may then be asked to describe each group and their basis for the grouping. This technique was used with some Navajo speakers and some Anglos at an early stage in the Navajo project, but the researchers found the results difficult to interpret given the small number of collaborators that were available. The sorting protocol did provide insights for reducing a large number of candidate photos to a more manageable set of forty photos for use in the photo interpretation sessions.

16.2.2.4 Semi-structured follow-up

Detailed analysis of the landscape terms used by the collaborators in the second and third stages has allowed the researchers to revise their previous understanding of landscape concepts in the languages
p. 382 studied. However, it has been important to ↳ conduct follow-up interviews, photo interpretation sessions, and field excursions to clarify confusions, probe for extra meanings, and evaluate the quality of interpretations. In the Yindjibarndi case study, the whole field research process took seven years and some key understandings emerged only from the most recent fieldwork.

16.2.2.5 Reporting back and getting feedback

It is very important for both practical and ethical reasons to report back to native language communities on a regular basis. In the Yindjibarndi case study, an initial version of a photo-illustrated dictionary of landscape terms was distributed to participating individuals and organizations early in the research process to encourage feedback. More recently a full-colour draft dictionary of 100 terms has been distributed, via the Yindjibarndi cultural organization Juluwarlu. The researchers have made a similar commitment to distribute digital copies of a photo-illustrated dictionary of Navajo landscape terms to each of the 100+ chapter houses on the Navajo Reservation. As mentioned earlier, O'Meara and some of the Seri collaborators designed and produced a children's workbook involving various landscape features found in the Seri territory.

16.2.3 Methods not yet implemented

The authors have employed several variants on the use of visual methods in landscape research. Our respondents have been asked to identify, and to provide terms for, landscape features on photographs, or to establish landform categories by sorting large numbers of photographs into groups. Yet another approach would be to have members of the target group take photographs, show them to their elders, and request oral descriptions, which, in some cultural groups may result in extensive stories about the significance of a given landform, relating it to history and/or to traditional stories. The advantage of this emic approach is that it is more culturally sensitive. This approach could provide important contextual information for landscape terms, and enhance understanding of the significance of terms obtained by other means.

A video (or animation) presentation featuring a person (or animal) moving through a series of different sorts of landscape features could be produced. Collaborators could be asked to view this video presentation and provide a verbal narration (in their language) which would later be translated and landscape terms identified.

To the best of our knowledge, three-dimensional relief models have not been used in ethnolinguistic fieldwork for elicitation in the landscape domain. However, such models have been used successfully in
p. 383 participatory community land-use ↳ planning in developing countries (e.g. Wisner, Stea, and Kruks 1991; Rambaldi and Callosa-Tarr 2002), and hold promise for elicitation of landscape terms. Virtual reality renderings of terrain might also be used, but would probably only be practical in laboratory settings.

16.2.4 Relevant methods used by other researchers

Researchers at the MPI have very extensive experience in linguistic fieldwork, and have assembled an extensive set of fieldwork materials and apparatus (see Majid, Chapter 2 above), as well as software for data analysis and storage (e.g. ELAN).

For instance, MPI linguists have used a questionnaire which provides a structured tool for eliciting landscape terms and toponyms (Bohnemeyer and Enfield 2002). Data collected through this questionnaire are intended to support the broader MPI project on words for place and space. The developers of the questionnaire suggest three overarching questions:

> how to formally identify placenames in the research language (i.e. according to morphological and syntactic criteria); what places placenames are employed to refer to (e.g. human settlements, landscape sites), and how places are semantically construed for this purpose. (p. 55)

Non-verbal stimuli developed by the MPI contain graphics which are used to elicit terms (e.g. for body parts) as well as story books, videos, and 3-D animations. Route descriptions have been especially effective for eliciting landscape terms and toponyms. Collaborators are also sometimes taken to prominent lookout points and asked to name landscape features that they can see.

Researchers at the MPI have also had success with referential communication tasks for collection of landscape terms (e.g. Burenhult 2008b). Two speakers are separated by a visual barrier but communicate by voice. One of them sees a target image or scene, and has to describe it well enough that the other speaker can reconstruct the scene or choose the correct image from a set of landscape images. The resulting dialog produces a good corpus of landscape terms, spatial relations, and directions in the context of natural discourse.

Heyes (2007) has used a number of visual and oral methods that he designed to gain an appreciation of Inuit conceptions of the environment. These included a series of drawing exercises, role-playing scenarios, 'knowledge-trees', memory exercises, genealogical charts, nomenclature exercises, and semi-structured interviews. He used a Filemaker database to assist with the sorting and coding of the large set of drawings of landscape features (with terms and names) that was obtained from collaborators.

Researchers of the Summer Institute of Linguistics (SIL 2009) have prepared a set of drawings for language
p. 384 elicitation, based on the environments and culture of ↳ Guatemalan regions of humid tropical forest. They provide picture sets for about sixty domains. One of the domains is 'natural phenomena', under which they provide illustrations of about 100 natural phenomena, many of which are of landscape scale or extent. Clearly, drawings have some advantages, and some disadvantages, compared to photographs. Unfortunately, there do not appear to be similar sets of images available for desert, semi-arid, or arctic environments, among others.

16.3 Threats to Validity of Cross-Language Interpretations of Landscape Terms

16.3.1 Some specific threats to validity

Some threats to validity of interpretation of landscape terms flow from the nature of ethnophysiography. Work on the ethnophysiography case studies discussed above indicates that definitions of landscape feature types in different languages differ significantly. The following list of potential threats to validity uses Yindjibarndi examples from Turk and Mark (2008), unless otherwise indicated:

a. Terms may relate to fairly equivalent concepts between languages; however the set of examples fitting the concepts might be quite different, e.g. *muji* 'cave': In Yindjibarndi *muji* is the word for a deep hole in *marnda* ('rock face'), with an overhanging roof (a cave), large enough to shelter a person or animal. However, many speakers of English will have experienced a much larger variation of types

and sizes of caves than those occurring in Yindjibarndi country. We do not know whether Yindjibarndi speakers would apply the term *muji* to very large caverns. And the word *muji* is also used for smaller holes that would not be called caves by English speakers.

b. What is the extent of any particular landscape feature for which there is a term? E.g. *marnda* refers to an area of *ngurra* (‘ground’) that stands higher than the country around it—a hill, mountain, ridge, or range. Does *marnda* include surrounding sloping ground or just the steep part of the feature?

c. Terms for sets of landscape features may not match up semantically, e.g. *marnda, bargu, burbaa*—cf. ‘mountain’, ‘hill’: *marnda* (see above); *bargu* is a *gubija* (‘small’) *marnda* made of rock or sand; *burbaa* can refer to a *gubija marnda* that is low, smooth, and rounded—not as steep as a *bargu*. Most instances of the term *marnda* in Yindjibarndi would be called *hill* in English, but features at the southern edge of
p. 385 Yindjibarndi country would probably be ↳ called ‘mountain’ in English but are still an instance of *marnda* to a Yindjibarndi speaker.

d. Different whole-part concepts: e.g. compare the Yindjibarndi terms *wundu, mankurdu,* and *yijirdi* to the English term ‘river’: A *wundu* is a relatively broad, level channel where water flows or lies after heavy rain. In Yindijibarndi country, there are no *wundu* that flow with water all the time. But the *wundu* is always there. If there is water in a *wundu*, the water is referred to as *mankurdu* if flowing deep and fast, *yijirdi* if flowing gently, and *bawa* if it is just lying there temporarily. Hence, a *wundu* is not really equivalent to a ‘river’ in English, as it does not include the water. The situation is further complicated by the fact that some *wundu* in Yindjibarndi country bear colonial English proper names ending in ‘River’, others in ‘Creek’.

e. Some terms effectively are defined by shape rather than by topographic objects, e.g. *burbaa* can refer to a *gubija marnda* that is low, smooth, and rounded—not as steep as a *bargu*. *Burbaa* also refers to a rise in a *yirdiya* (‘road’, ‘track’ or ‘trail’), especially at the crest. *Burbaa* can also be used to refer to low, rounded areas of higher ground, for instance between *garga* (‘gullies’). Here, the term seems to relate more to the shape of the ground, rather than to a particular type of landscape object.

f. Physical point of view may influence conceptualization: e.g. (in Navajo) initial results suggest that *tséyi’* may be preferred for a rock canyon seen from the canyon floor, whereas *tsékooh* would be preferred when the same feature is seen from above the rim. Thus, it is at least possible that there may be more than one term for a particular type of landscape object, depending on the location of the observer. Also, some landscape features are so large that they can only be recognized by viewing from a considerable distance, and others can only be seen when nearby. In Seri, parts of the beach have different names: e.g. *hastoj cnoosc* is the section between low and high water mark.

g. Some terms may refer to spatial locations (places) rather than landscape features, e.g. *wana, wanangga*: *wana* refers to a hillside (or perhaps a flat area) in the middle distance—where you can still see something (like a kangaroo) but it is much too far away to throw a stone at it (or shoot the kangaroo). *Wanangga* could refer to the location of something in the middle distance. This perhaps is an example of landscape being thought of as a field (for observation and activities) rather than as a set of objects.

h. Spiritual aspects of place, e.g. *yinda* (‘permanent pool’): every *yinda* has a *warlu* (‘spirit’ or ‘mythic snake’), that formed and protects the *yinda*. Specific types of landscape features may have spiritual associations, which are part of the meaning of indigenous landscape terms.

i. Groups of places: generic landscape terms, and also toponyms, sometimes refer to groups of landscape features (Hercus and Simpson 2002; also Nash and Simpson, Chapter 17 below).

p. 386 j. ↳ Sets of places, related by spirituality, e.g. *Jirndawurrunha*: During an audio recording session examining photos of landscape features, with the researchers asking for landscape terms, the Yindjibarndi collaborators spontaneously referred to spiritual aspects of the features. The collaborators talked about how the *warlu* ('mythic snake') had come up out of the ocean near Onslow and travelled up the route of the Fortescue River, chasing two boys who broke the Law, until he got to *Jirndawurrunha* (Millstream) (Ieramugadu Group 1995). This is part of an explanation of what Yindjibarndi call the 'learning times' or 'when the world was soft'. This is part of what is also known as 'the dreaming', a translation of indigenous explanations of the formation of the world into its current landscape and ongoing spiritual aspects of landscape. Hence particular places may be part of a set of places linked by a 'dreaming' path.

k. From our discussions, it seems possible that some types of landscape features may be so rare, or even unique, in the territory of the language community that they always have a toponym and there is no generic term used for that type of feature (e.g. prominent mountains).

Other threats are more closely linked to the field methods used and the way data is interpreted. These include:

1. There may be ambiguity of reference leading the linguist to misinterpret the meaning of a term—e.g. previous Yindjibarndi dictionaries (Wordick 1982; Anderson 1986) indicate that *mankurdu* means 'Fortescue River'. However, subsequent fieldwork has shown that *mankurdu* refers to water flow that is deep and fast, and thus has a meaning similar to that of the English word *flood* (Mark and Turk 2003; Mark et al. 2007; Turk and Mark 2008).

2. One potential problem with elicitation in the field is defining and recording the referents of terms (i.e. the particular landscape features). GPS can be used to document the location where the collaborator was standing when he or she used the term, but it is more difficult to record, or even infer, the direction of, and distance to, the referent, although recorded pointing gestures and comments might partly help resolve any confusion.

3. Using landscape photographs can be problematic, as the photo may well contain several landscape features, and great care needs to be taken to ensure that the meaning of terms given are properly interpreted. Also, collaborators may misjudge the actual sizes of features in photographs, and if their language has two terms, one for larger and the other for smaller features that otherwise are similar, they might choose the 'wrong' term.

4. One problem in photograph-based elicitation is the selection of the photographs or images to be used. Should one use photographs of places or features familiar to the collaborators, or of unfamiliar places
p. 387 but in their traditional environment, or of far-away places? A psychologist likely would ↳ prefer neutral, unfamiliar, or even synthesized examples. But for familiar features, collaborators can bring background knowledge into their choice of terms. Also, Yindjibarndi collaborators were reluctant to give terms for features in photographs of country of their neighbouring language group: 'That's Bunjima country, you should ask Bunjima people.' A similar comment was made by a Navajo collaborator when presented with a photograph of a Western Australian landscape feature.

5. With bilingual collaborators, one can ask for the speaker to give words that mean 'river' or 'hill' in their language, but this has a higher risk of producing a greater cross-language conceptual match than might actually exist.

6. A term may be correctly documented as referring to a particular type of landscape feature, but it may also mean other things as well. In Seri, for example, *xatj* appears to have a more extensive meaning

than *reef* in English; additional elicitation might be needed to determine whether the term has a more broad semantic reference than originally thought, or whether it is polysemous.

7. A term may be used for a landscape feature but be in effect a generic term for something of that type (e.g. shape). In Yindjibarndi, *yirra* means the exact edge of a hilltop or a water body but also means 'tooth': is a body part metaphor being employed, or is the core meaning of *yirra* 'sharp edge'?

8. Some languages may have different terms for the same features which are used under different circumstances,—e.g. Navajo speakers use different proper names (toponyms) for the same features in different contexts, and some of these contexts are themselves seasonal. Also, some terms are based on appearance, which may vary with seasons.

9. It is possible to overemphasize lexicalization of concepts in our studies of categorization in ethnophysiography. Are monolexemic terms (i.e. concepts labelled by a specific, simple word) more cognitively salient than concepts that require longer phrases to describe? For instance, O'Meara has found that for Seri, of the 100 landscape terms that have been documented to date, at least 88 have transparent etymologies combining a term for a landscape material (rock, earth, fresh water, or sea water) with a modifier, or are a derived nominal (e.g. a nominalization). Thus at most 12 of the Seri terms for landscape elements are monolexemic. Mark and Stea have observed a similar, though less extreme, trend for the Navajo language, where at least 64 of 163 landscape terms and phrases from published dictionaries (and other sources) begin with a landscape material term followed by shape or position/orientation indicator(s), and are thus clearly multi-morphemic. ↳

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16.3.2 Addressing threats to validity

Many of the threats discussed in the previous section are addressed by the fieldwork methods discussed in §16.2. In general terms, threats will be reduced through: use of multiple methods ('triangulation': Webb et al. 2000) and iterative procedures; using a diverse range of collaborators; not 'leading the witness'; being open to alternative interpretations; and becoming as intimate as possible with lifestyle and social structures of the language community.

More specific ways of addressing threats to validity include the following:

- Elicitation can be done using only 'words' or 'language', either oral or (in some cases) written. Requesting formal definitions of terms can seem unnatural to language speakers, but it should not be dismissed as a method. Asking people to explain the meaning of a term may be a more natural way to gain insight on meanings. Asking for differences in the meanings of two or more terms that refer to entities in the same domain, or asking for examples of usage of terms, are especially useful approaches.

- Spelling is something of an issue in this research. For instance, the Yindjibarndi had no written language before European contact, and some of the sounds used in Yindjibarndi are not used in English. Hence, different linguists have decided to interpret and write down particular phonemes in different ways. Standardization of approach is critical to minimizing potential confusion. Where standardized spelling has been agreed upon by linguists it is important to recognize that this may achieve importance among indigenous peoples themselves: one of the authors was criticized by an indigenous Australian at a recent conference for a spelling 'mistake', when he did not follow spelling conventions adopted in a dictionary compiled by Europeans.

- Use of trips through the people's traditional country are very useful, and might produce the most 'authentic' results if one uses traditional modes of transport, such as walking or travel by canoe.

However, in the case of endangered languages, while elders are often considered to be the best collaborators, they might have mobility problems due to age. Field travel by modern vehicles may work well in some cultures, especially if the collaborators now normally travel in motor vehicles.

- For some landscape terms in some languages, it seems that observing *actions* in the landscape might better elicit terms that are tightly connected to affordances of landscape. For example, a term for a type of high ground might be coupled to the act of walking to the top of it for a view of surrounding terrain. Sometimes it might be possible to conduct appropriate actions in the field. However, animations or video clips might serve the same purpose and be more practical. They also would facilitate better
p. 389 'control', since the same clips could be shown to multiple collaborators. ↳

16.4 Some Ethical Issues

If ethnophysiography is genuinely to seek to understand the way that landscape is treated in languages across the world, it must do so from a perspective that is not biased towards western concepts of knowledge. In particular, if key case studies of differences between languages are carried out with indigenous peoples, then their worldviews must be reflected in resulting theories.

Such an approach is justified on scientific and ethical bases, but is also necessary to ensure collaboration by indigenous people in ethnophysiography research. Whiteley (1998) discusses what he sees as a crisis in ethnography as it has been practised with Hopi people, and explains why Tribal officials have adopted severe restrictions on research activities. He suggests: 'The reasons for indigenous resistance to cultural commodification by academic ethnography are several...but at base they are the result of the social and political estrangement of anthropology as a research-university discipline from the perspectives and situated interests of its subjects' (p. 6). Researchers must not only respect indigenous knowledges but also deliver practical benefits to communities.

Linguists, and others, collecting information about endangered languages may feel that language preservation is their key consideration. However, there is also almost always at least some element of 'appropriation', of 'taking away' things of value from the culture. The usual 'Enlightenment' defence that data collection for research is for the 'good of science' may not carry much weight for indigenous collaborators. Smith (1999: 1–2) put this position very strongly:

> From the vantage point of the colonized, a position from which I write, and choose to privilege, the term 'research' is inextricably linked to European imperialism and colonialism. The word itself, 'research', is probably one of the dirtiest words in the indigenous world's vocabulary. When mentioned in many indigenous contexts, it stirs up silence, it conjures up bad memories, it raises a smile that is knowing and distrustful. It is so powerful that indigenous people even write poetry about research.... This collective memory of imperialism has been perpetuated through the ways in which knowledge about indigenous peoples was collected, classified and then represented in various ways back to the West, and then, through the eyes of the West, back to those who have been colonized.

Several indigenous participants at the 'Language in Landscape Workshop' in October/November 2008 expressed similar sentiments, arguing strongly that it was essential to understand the worldview of a specific indigenous group before attempting to interpret linguistic data (Turk and Mark 2011). They also emphasized the need for particular language communities to have a strong role in directing linguistic research, especially where the topic is landscape and toponyms, given the centrality of place in indigenous consciousness (Basso 1996). Similar sentiments were expressed by language communities in our own ethnophysiography case studies. For instance, members of the cultural maintenance group Juluwarlu have

p. 390 insisted that they hold ↳ the official, definitive copy of the Yindjibarndi language dictionary, rather than a national linguistic organization, or even the regional body, the Pilbara Aboriginal Language Centre (Wangka Maya).

It is important that all linguistic fieldworkers are carefully attuned to the rights of collaborators and language communities. Ethical issues especially important in the field of ethnophysiography include:

- ensuring proper permission is obtained for all fieldwork, through the local cultural organizations (which may have formal or informal approval processes);
- appropriate payments to collaborators to compensate for their time and effort;
- using both male and female researchers to ensure that gender-sensitive issues are appropriately handled;
- permitting the maximum possible community control of the project; its timing, direction, and conclusion;
- not eliciting, recording, storing, or publishing any secret/sacred information not directly relevant to the study;
- obtaining clearance from representatives of the language community for publication of all material and inclusion of culturally appropriate acknowledgement of collaborator contributions;
- providing feedback to the community about the project in a culturally appropriate manner;
- making sure that multiple hard (printed) and soft (CD) copies of all data and resulting publications are left with key people and organizations within the community.

Some of these ethical recommendations may be difficult to adopt for small-scale projects. For instance, it may not be possible for a postgraduate student project to include researchers from both genders and hence to interact with collaborators from both genders. In such circumstances, the research should carefully consider the implications of this constraint on data collection and expressly discuss the matter when reporting the research results.

Carrying out this sort of case study is greatly assisted if it is organized through a key individual and/or organization from the language community. In the case of the Yindjibarndi study, author Turk (and his wife, Dr Kathryn Trees) have a very long-term relationship with the community at Roebourne, and the ethnophysiography fieldwork was facilitated by this relationship and through the collaboration of Juluwarlu. For the Navajo study, the key facilitator role is being carried out by local Navajo consultant Carmelita Topaha. In the case of Seri, O'Meara has been conducting fieldwork on an annual basis in El Desemboque since 2004. Over the years, she has developed a close relationship with her primary native speaker collaborator, Alma Imelda Morales Romero, who has acted as both a local consultant and primary collaborator.

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16.5 Conclusions

This chapter defined and explained the research field of ethnophysiography and its role in documenting aspects of languages relating to landscape. Together with a discussion of key ethical issues, it also summarized methods used in obtaining terms for landscape features and toponyms in a manner which addressed an identified set of threats to the validity of the information. The authors hope that this chapter will assist others undertaking similar work, and would very much welcome enquiries about their efforts. Some relevant papers can be found at: http://www.ncgia.buffalo.edu/ethnophysiography/.

Notes

1 Carmelita Topaha facilitated the fieldwork with Navajo language speakers, and Larry King assisted understanding of Navajo landscape terms. Our understanding of the issues discussed in this chapter has been enhanced through interaction with Yindjibarndi, Navajo, and Seri people, and we greatly appreciate their time, assistance, and patience. Permission for the research to be carried out on the Navajo Reservation was provided by the Navajo Nation's Historic Preservation Department under Cultural Resources Investigation Permit No. C0513-E. Funding support by the US National Science Foundation (grants BCS-0423075, BCS-0423023, BCS-0553965 and BCS-0723694), from Murdoch University, and from Microsoft Research is gratefully acknowledged.

2 For a definition of ‘etic’ see the first paragraph of Dousset, Ch. 9 above.

3 O'Meara has worked with more speakers of Seri during her fieldwork seasons, but not necessarily on landscape-related work.

4 In cases where the native speaker consultant does not wish to draw, the researcher can draw the scene slowly in collaboration with the consultant to achieve similar results.