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Making Use of Hidden Data: Towards a Database of Weather Predictors

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ABSTRACT

Anthropologists often have interesting and valuable data that remains 'hidden' because it does not fit easily into conventional academic publishing formats. This article suggests that it is worthwhile to make use of this hidden data for the benefit of other researchers and the study communities. To illustrate, the article describes initial efforts to create an online database of traditional weather prediction indicators derived from observations of the ecosystem. The database was started with descriptions of more than a thousand prediction indicators used in Northeast Brazil, which were collected as part of a survey of farmers and 'rain prophets'. It is argued that such a database is important not only as part of the anthropological record, but also for the preservation of cultural heritage, and as a baseline for studies of environmental change. Some of the theoretical, practical, and ethical issues that have emerged in developing the database include: determining how much contextual information to include, obtaining translations, recruiting contributors, and properly acknowledging intellectual property. While there seems to be a great deal of enthusiasm for the idea from various sectors within and outside of academia, difficulties in securing funding for this interdisciplinary project and establishing a group of collaborators have so far presented significant obstacles.

INTRODUCTION

During fieldwork, anthropologists often end up collecting data that are interesting and have potential importance for future analyses, but which have no direct relevance to the current project. Or, the data are relevant but are never published in their entirety, and instead, representative examples are selected to illustrate a type or category to readers. Long lists, large tables, and complex trees, with hundreds or even thousands of pieces of information, are not appropriately displayed in journal articles, and books with such appendices are relatively rare in comparison to what I suspect exists in the notebooks and computer files of anthropologists worldwide. One is left with a nagging feeling that something should be done with these 'hidden data': they should be archived or made publicly available somehow, not only for the benefit of other researchers, but also for the communities who provided the information. In this article, I discuss some of the theoretical, practical, and ethical issues that have emerged during my initial efforts to create an online database of indigenous weather prediction indicators.

THE DATA

During 14 months of fieldwork in Ceará, Northeast Brazil, I collected over a thousand weather prediction indicators known by peasant farmers. The focus of my research was the prediction methods used by **profetas da chuva**, or 'rain prophets', most often subsistence farmers who base their forecasts for the coming rainy season largely on local knowledge of patterned changes in the ecosystem. For example, they observe the behavior of insects, the timing and distribution of flowers and fruits on trees, the reproduction of small animals, and bird songs. In addition, many rain prophets also take note of clouds on the horizon at sunrise and sunset, the movement of certain stars, the position of the moon, and the type and direction of winds in the months preceding the expected rainy season. Rain prophets draw on their observations of a combination of these indicators to make their predictions each year. After interviewing about 20 rain prophets, I had recorded well over a hundred prediction indicators and I could tell that I was barely scratching the surface of this wealth of local knowledge.

While everyone seemed to know some indicators, it seemed that the rain prophets earned their reputations in part because they had a larger repertoire to draw on compared to other farmers. In order to test my hypothesis that rain prophets knew more signs, I conducted a survey of 188 farmers in three regions in the state of Ceará (Pennesi 2007). The challenge in the survey design was to find a way to determine the distribution of knowledge of prediction indicators among the rural population when there is no canon of signs nor a body of knowledge assumed to be shared. Each person has his or her own experiences and interests, meaning that two rain prophets may know the same number of signs but they might be two completely different sets. To address this problem, I first compiled a list of commonly reported signs from the initial interviews I had done. These were divided into categories including: birds, animals, insects, plants, celestial bodies, wind, clouds, calculations/special dates, and experiments. At the start of each survey, a couple of the more well known **sinais** ('signs') for predicting rain were described and respondents were asked to describe other signs that they knew. After the respondents finished volunteering information, they were asked whether they knew the other indicators on the list for that category. For each indicator, respondents stated whether they had only heard of it or whether they actually used it themselves, and how reliable it was in predicting rain. I organized the data provided by respondents in the manner illustrated by Table 1.

All new signs were added to the original list and the survey process thus generated over a thousand indicators. With this method, I was able to document many indicators that were unique to specific individuals, and at the same time, it provided an idea of how knowledge of the common ones was distributed more widely across regions. I organized the indicators in an SPSS database, with each one a separate variable having values within a scale of reliability as determined by each respondent (see Table 1). From the initial interviews and the surveys, a description of all the indicators in the respondent's own words was recorded in a separate document. As I created this database and documented all of the indicators, I became interested in comparing what I had found with prediction methods in other cultures and in different ecosystems.

WHY CREATE A DATABASE?

Within the field of ecological anthropology, documented traditional knowledge has included local taxonomies of plants, animals and fish (Balée 1994; Marques 2001), in conjunction with ethnographic descriptions of associated practices and cultural meanings. Information is organized in lists, tables, charts, and diagrams, in an attempt to represent the cognitive and linguistic associations that sort items into categories. A web-based database can be considered the latest version of this kind of documentation, with the advantages that the information can be easily and cheaply updated, and made accessible to a wider audience.

TABLE 1. Example from survey of traditional weather prediction indicators.

Insect	Observation	Sign	Reliability
Ant	(a) creating wings	Much rain to come	NE
	(b) storing food	Drought or late rains	2
	(c) moving from low to high ground	Good rainy season	2
Bee	(a) abandon the hive	Rain will come soon	1
	(b) produce a lot of honey	Good rainy season	N
Others	"When the 'wood-saw' bug cuts down a lot of branches in May…"	"It's going to be a good rainy season next year."	1

Key for reliability coding:
2 - always works as predictor
1 - sometimes it works and sometimes it's wrong
0 - it's not good for making predictions
NE (no evaluation) - knows the sign but can't evaluate it
N - doesn't know the sign

The database of indigenous weather prediction indicators will include data from cultures worldwide and can serve as an archive of traditional ecological knowledge. While there are a few cases in which weather prediction traditions are the focus of research (Galeno 1998; Goloubinoff et al. 1997; Magalhães 1963), in the bulk of the literature, ways of predicting weather are only briefly mentioned and are not described in detail (e.g. Ingram et al. 2002; Luseno et al. 2003). The aim of the database is to highlight the prediction traditions and make the hidden data available in a searchable online format. As interest in weather and climate change grows, a regional or even global database of prediction methods and observations becomes relevant to several academic disciplines, as well as for policy-makers and for local communities wishing to compare their experiences to those of others facing similar weather-related problems. Thus, the purpose of the database is to compile existing information in a way that is accessible and useful in multiple ways to make such comparisons possible.

Establishing a set of baseline observations makes it easier to identify ecological changes as well as variations in knowledge and practices over time and across space. For those concerned with documenting and studying climate change, there is value in having access to ecological data such as which trees are flowering earlier or later than usual, appearance or disappearance of birds or insects, and increased or decreased reproduction among certain animals. For example, in Burkina Faso, farmers report that traditional methods for predicting rains are becoming less reliable due to changes in climate (Roncoli et al. 2003). Similar observations are being made in Northeast Brazil. This kind of information could be indicated in the database, with descriptions of specific observed differences in particular years and the corresponding observations of rainfall. Tables 2 and 3 show two examples.

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TABLE 2. Example of database entry with observations on reliability and recent changes.

Location	Quixadá, Ceará, Brazil
Source	Farmers and traditional weather forecasters
Sign	If an armadillo has ticks in the armpits in December or January, the rainy season will be good with a lot of rain.
Past Reliability	This sign is not commonly known but the traditional experts say it is reliable.
Recent Observations	Armadillos are rarely seen due to a reduction in the population in recent years, making this indicator less reliable than in the past.

TABLE 3. Example of database entry with observations on reliability and recent changes.

Location	Quixadá, Ceará, Brazil
Source	Farmers and traditional weather forecasters
Sign	When the termite nest is large and full of larvae, the rainy season will be good with a lot of rain.
Past Reliability	This is a commonly known and reliable sign.
Recent Observations	In 2010 many termite nests were filled with larvae but the area received 60 percent less rainfall than the historical average.

THEORETICAL, PRACTICAL, AND ETHICAL ISSUES

Creating a historical record that has relevance in the present and will be useful in the future requires careful consideration of theoretical, practical, and ethical issues. Deciding what constitutes the data is the first question to be answered. My corpus of traditional weather prediction indicators consists of short written descriptions. This has some limitations. Contextual information that makes the indicators culturally meaningful, such as the wider interactional context in which reports of the indicators are made or descriptions of activities performed while observing the indicators, is missing or incomplete. While I recognize the limitations of decontextualized local environmental knowledge (Cruikshank 2005), when I collected the data, I did not foresee the need for this kind of contextual information and it is not now available.

The question of how much or what kind of contextual details should be included arises for each data set provided by contributors. In contrast to a multisite project in which similar kinds of data are collected in a standardized format, making use of data that already exists in its various forms presents significant challenges. With so many contributing sources, flexibility in the design is necessary. For this database, essential content includes the location or region where the indicators are observed, a textual description of the signs, and the source of information. This will make up the entry for each submission. Links to photos, videos and other related information can appear on the page for that entry as optional content. This way there is both a standard format and allowance for varying levels of detail. Table 4 provides an illustration of the content.

Another complex issue is translation. To reach the widest audience among Internet users, it is necessary to produce English translations of descriptions and scientific names for plant, animal and insect species. The problem is that data contributed from other cultures may have been collected in a local dialect of a standard language or in a vernacular language which is not the official or national language of the country of origin. In such cases, translations into both a national language and English, in addition to determining the scientific names, becomes a time-consuming task. In addition, matching scientific names to popular terminology can be difficult without samples or photographs, and these are not often taken unless the original research project necessitated it. Nonetheless, having the local names and glosses in a standard official language is sufficiently useful to warrant inclusion in the database. Furthermore, making local names and photos available in the database provides a forum for researchers to seek help in identifying species.

The biggest practical challenge in creating a database of this scope is getting other people to contribute their data. That requires advertising and making people aware of the project, and then motivating them to prepare and send in their data. Since the goal is to continually update and build the database,

TABLE 4. Illustration of database entry with translation and link to more information.

Location	Quixadá, Ceará, Brazil
Source	Farmers and traditional weather forecasters
Sign (Portuguese)	Quando a formiga de roça (genus Atta) está armazenando comida, é sinal que as chuvas vem tarde ou vai ter estiagem.
Sign (English gloss)	When the black ants (genus Atta) are storing food, it's a sign that the rains will come late or there will be a dry period.
Past Reliability	This sign is widely known by farmers and reliable.
Recent Observations	In 2010 people observed this sign in February and there was a 32 day period without rain.
Further Details	<<Link to image of the ants>> <<Link to introduction page on Quixadá, Ceará, Brazil>>

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obtaining contributions is an ongoing issue. Human resources are needed to solicit data, evaluate its appropriateness, and organize diverse kinds of information within an effective format. While many researchers I have spoken with agree that such a database would be valuable, limits on their time can make it difficult to follow through on promises to contribute. The solution is to create a pilot version of the database and put it online in order to demonstrate the potential and attract more contributions.

The main ethical issue with creating an online database is related to intellectual property. Making traditional knowledge widely accessible to the public via the Internet runs counter to some cultural beliefs about the power of knowledge and the proper way to share information. While most of the rain prophets I worked with in Brazil were happy to explain how they make their predictions to those who took an interest, this is not always the case in other cultures. Anthropologists are bound to respect the confidentiality of the information they collect so the database can only include what is permitted to be disseminated. At the other end of the spectrum, some people may want to be given credit for their prediction methods and disputes could arise as to whose version is selected. From a practical point of view, the ethical responsibility to obtain permissions and give credit can only rest with the contributor as the administrator will be unable to verify all cases.

CONCLUSION

The online database of traditional weather indicators remains in the developmental stage. In large part, this has to do with difficulties in obtaining funding for an interdisciplinary project which makes use of existing data rather than producing new research. Nonetheless, there is both a need and a great potential for collaborations such as this. Working across disciplines brings out unexpected complications as new questions are raised about form, content and even the project goals (Pennesi 2009), yet collaborative projects enable us to expand the potential of our research to achieve insights that individual efforts could not produce alone. It is worthwhile to find ways to publish the 'hidden data' anthropologists keep in their notebooks and computers because after the passage of time has rendered current theoretical questions less urgent, the detailed information we have documented can still hold relevance for future studies and for the historical record. This becomes especially important as changing climates provoke ecological changes. The kinds of data we collect on how people interact with their environment can be useful in determining both the impacts of changes and mitigating actions to adapt to them. The first step in preventing data from becoming buried or hidden is to pay attention during fieldwork to types of data that are available, if not immediately relevant. It may not take much effort to collect it in a more systematic way. The next step is to look at the kinds of data we have from a fresh perspective and consider how they could be made accessible outside of the usual academic publishing formats. This requires a shift in focus from thinking of our data as our own, to seeing the information we collect as having value beyond our own theoretical interests. The database described here offers one example.

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