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The role of linguistics in cultural astronomy

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Abstract: Cultural astronomy research in contemporary societies requires knowledge of the indigenous languages which encode that knowledge of the sky. Here we discuss two examples illustrating the errors which can occur when there is inadequate control of the relevant linguistic issues. These errors are of two types, deriving from (i) invalid assumptions about translational equivalence within complex domains of knowledge, and (ii) inattention to subtle linguistic distinctions. Avoiding these errors requires both greater attention to cultural astronomy on the part of linguists, as well as increased interdisciplinary collaboration between astronomers, anthropologists, linguists, and indigenous communities.

Introduction

In this brief paper I make a plea for greater interdisciplinary collaboration in the field of cultural astronomy. Specifically, I examine the important role that linguistics can play in the study of cultural astronomy in contemporary societies, and in turn, the ways in which cultural astronomy can inform language documentation. For ancient cultures we must often rely on monuments and artifacts to infer knowledge of the sky. Without written records the builders of these monuments are silent. In contrast, when researching cultural astronomy in contemporary societies we have the luxury of language: we can actually talk with people about the sky. However, cultural astronomy research with living cultures is nevertheless challenging, since knowledge of the sky may be encoded in a language which is unfamiliar to the researcher.

In seeking to understand ancient views of the sky, the need for interdisciplinary research is obvious, as the monumental focus of archaeoastronomy naturally lends itself to collaboration between archaeologists and astronomers. The need for collaboration may seem equally obvious in ethnoastronomy, since a living culture's understanding and relationship with the sky is expressed through the medium of language, providing a natural role for linguistics. However, in practice the study of cultural astronomy among present-day peoples has been undertaken independently by astronomers, anthropologists, and linguists, each with a very disciplinary focus, leading to false and misleading conclusions about the nature and extent of indigenous knowledge of the sky.

Two types of errors commonly occur when linguistic issues are overlooked by cultural astronomers. The first type of error results from an assumption of translational equivalence. The second type of error results from inadequate control of the linguistic details. Below I discuss each of these types of errors in turn, drawing on examples from recent literature. While these examples are not necessarily typical, they illustrate the difficulties encountered at the intersection of cultural astronomy and linguistics. Understanding the particular factors that led

to each type of error can help us to improve future collaboration between linguists and cultural astronomers. I conclude by suggesting a path forward toward greater interdisciplinary collaboration, noting ways in which linguists can better contribute to the documentation of cultural astronomy.

Lost in translation

Consciously or not, many scholars approach ethnoastronomy by seeking translational equivalents for known constellations. This approach assumes that, more or less, the asterisms found in one culture will also be found in another culture, though with different names. Seen through this lens, the interest of cultural astronomy lies not in the language itself but rather in the translational equivalent. For example, MacDonald (1998, p. 79) describes the Inuit constellation *Tukturjuit* as “a constellation involving various arrangements of the principal stars in the European constellation Ursa Major, particularly the seven stars of the ‘Big Dipper’.” Noting that this name literally means ‘caribou’ MacDonald goes on to note that “Ursa Major’s particular association with caribou appears to have been recognized in most parts of the Inuit world.” Linguistics and language are quickly set aside as the English translation caribou comes to serve as a stand-in for the Inuit term. For the Inuit, the Big Dipper is a caribou. End of story. We can then proceed to draw conclusions about Inuit conceptualizations of the night sky based on the image of the caribou and its role in folklore. All this can be done without having to refer back to the Inuit language, as the English translational equivalent is seen as sufficient for these purposes.

More often than not this approach yields passable results. Many asterisms do have a near universal significance which invites identical or nearly-identical categorization across cultures. Indeed, the stars comprising Ursa Major are widely recognized as a coherent asterism in many unrelated cultures across the world. Compounding this universal tendency are the powerful effects of diffusion through which the constellations identified by the Babylonians have been disseminated far and wide across the globe (Baity, 1973). Taken together, these forces invite a universalist interpretation whereby local names for asterisms are seen to be translational equivalents of classical constellations.

The problem with this approach is that there is not always a one-to-one correspondence between local asterisms and classical constellations. Not all cultures carve up the night sky in the same way. This is not just a matter of assigning different names to the same groups of stellar objects; rather, this is a matter of seeing different groups of objects in the sky. Cultural astronomy is not a mere set of vocabulary items but rather a complex domain of knowledge analogous to other complex linguistic domains such as biology, landscape and kinship.

Before continuing with the discussion of ethnoastronomy, it’s worth briefly considering how other complex domains of knowledge are treated in the literature. The study of ethnobiology reveals that not all cultures make use of the same taxonomies. The Tobelo of Eastern Indonesia make a primary distinction between ‘breathers’ and ‘non-breathers’: some types of coral fall into the former category, while other types fall into the latter (Taylor, 1990). Here the taxonomy itself provides insight into the way Tobelo conceptualize the biological world. The

domain of landscape provides an additional example of categorical variation across language. The Yeli Dnye term for *mbu*, though sometimes translated as ‘mountain’, can equally refer to any convex shape, even a mound of sand kicked up by a crab (Levinson, 2008). Yeli Dnye speakers clearly view the landscape through a different lens than do English speakers, and the English word ‘mountain’ is an unsatisfactory translational equivalent for *mbu*. Finally, the domain of kinship provides another example of an area of knowledge where translational equivalents are sometimes difficult to find. In Western Pantar, as in many cultures with so-called cross-cousin systems, I call both my male parent and his brothers by the same term *niba*, while I use a distinct term *nirasi* for the brother of my female parent (Holton, 2014). Attempting to translate these terms using the English words ‘father’ and ‘uncle’ yields misleading results. There is no translation equivalent for a cross-cousin kinship system in English. The system itself is so fundamentally different that attempting to use standard English kinship terms to describe it fails to capture the essence of the system. All of these complex domains of knowledge beg to be understood in their own terms rather than blurred by the lens of translational equivalents.

In this respect ethnoastronomy is no different from other complex domains of knowledge. To understand indigenous stellar astronomy as a system, as opposed to a collection of names for predetermined objects, one must move beyond an approach that relies on translational equivalency. A good example of this alternate approach can be found in the work of Chris Cannon (2014), who has documented a rich system of cultural astronomy among the Northern Dene. Early ethnographers reported a paucity of star knowledge among the Northern Dene. Writing of the Gwich’in, Robert McKennan reported that “my informants said their people had never been much interested in the heavenly bodies, and this is borne out by the paucity of starlore” (1965, p. 73). Kaj Birket-Smith makes a similar observation regarding Dene-Sųline (Chipewyan), claiming that “the astronomical knowledge of the tribe ... seems to be only very small” (1930, p. 78). In contrast, Cannon documents a whole-sky circumpolar constellation *Yahdii* centered on Ursa Major but spanning more 133 degrees across the sky (Cannon & Holton, 2014). How could this rich astronomy have been missed by earlier researchers?

As it turns out this term *Yahdii*, variously spelled, appears in the very earliest literature, where it is identified as either Ursa Major or the Big Dipper. Thus compare *eutyae* (Simpson, 1843), *yutié* (Petitot, 1876), and *yáhdi* (Benveniste, 1953). These early encounters occurred at a time when star knowledge would have still been relatively vibrant among the Gwich’in, yet few constellations other than *Yahdii* are documented in these sources. Previous researchers knew the term *Yahdii*, but rather than attempting to determine its true meaning they simply assumed a translational equivalence with Ursa Major. A likely scenario is that these early researchers simply pointed up at Ursa Major and asked ‘What do you call that?’ Perhaps these early researchers didn’t even go that far. Much early ethnographic work was conducted during the arctic summer, a time when stars are not visible. So it is entirely plausible that these names for *Yahdii* were collected by dimly asking people ‘What is your word for Big Dipper?’

Cannon’s success is thus directly attributable to his willingness to discard preconceptions about translational equivalency. While he draws heavily on his training as an astronomer and as an anthropologist, Cannon’s methodology relies critically on asking people not what they call the

Big Dipper but rather what they see in the night sky. This approach is admittedly more time consuming but it yields better and more accurate results.

Linguistic analysis

The lack of translational equivalence is not the only linguistic challenge for cultural astronomy. Sometimes the linguistic analysis itself can be deceptively tricky, leading to misidentifications of certain forms. Cultural phenomena may be shared across related and unrelated language groups, so cultural astronomers must often synthesize data from multiple languages in order to draw wider conclusions about stellar knowledge. For example, the Gwich'in constellation *Yahdii* is known in the closely related South Slavey language as *Zhida*. While these terms may seem quite different, they actually correspond quite regularly, analogous to the way that the *p* in Latin *pater* corresponds to the *f* in English *father*. Knowing the technical details of the linguistic history of the Dene languages is crucial to understanding this correspondence. Too often cultural astronomers proceed without such technical knowledge. An example can be found in the case of the Micronesian name for Altair.

Altair is well-known in the study of Micronesian celestial navigation as the center of the Carolinian sidereal compass. Goodenough calls Altair “the base star in the native compass” (1953, p. 5). With a declination of approximately 8 degrees north, Altair traces a roughly east-west arc across the top of the sky at the latitude of the Caroline Islands. For nearly fifty years Altair has been known in the literature as the ‘big bird’, a translation first popularized in the title of Thomas Gladwin’s (1970) book, “East is a Big Bird.” In particular Gladwin asserts that “on Puluwat [Island] the cardinal direction is east, under the rising of Altair, the ‘Big Bird’” (1970, p. 148). This meaning is found also in David Lewis’ book “We, the Navigators,” which recounts the author’s voyaging with Puluwat navigator Hipour (Lewis, 1972, p. 130). In “The Last Navigator,” based on his work with Mau Pailug, a navigator from neighboring Satawal, Stephen Thomas describes Altair as “the cardinal direction, east, under Mailap, the ‘Big Bird’” (1987, p. 83). Ben Finney also cites a Satawalese form, noting that “the compass is not oriented on due east, but on rising Altair (*Mailap*: ‘Big Bird’)” (2007, p. 160).. The term *Mailap* with the meaning ‘Altair’ is found in dictionaries of several closely related languages, including Satawalese, Puluwatese (Elbert, 1972), and Woleaian (Sohn & Tawerilmang, 1976). However, despite popular opinion *mailap* does not mean ‘big bird’.

What then is the meaning of *mailap*? The final element *-lap* does mean ‘primary, main, big’, so the star *Mailap* is thus the ‘main or big *mai*’. But in none of these languages is the element *mai* recognizable as meaning ‘bird’. Instead, the general term for ‘animal, bird, living being’ is Satawalese and Puluwatese *maan* and Woleaian *mal*, regularly reflecting Proto-Micronesian **manu* (Bender et al., 2003). In particular, the final *-*n* element of the original word for bird is never lost. It is preserved as *n* in Satawalese and Puluwatese and changed to *l* in Woleaian. In English these two sounds are always distinguished, never meaning the same thing. In Micronesian languages these sounds may vary freely, or one language may have *l* where the other has *n*. Though seemingly distinct to English speakers, these sounds are not so distinct to Micronesians.

So how did Altair come to be known as the big bird? Essentially, the answer boils down to a linguistic misunderstanding, as described in detail by Holton et al. (2015). Gladwin's book was based on 2.5 months of research on Puluwat in 1967. Gladwin didn't speak Puluwatese, but he did have some knowledge of Chuukese, a related language which he had learned during his time in Chuuk twenty years earlier. This reliance on Chuukese turns out to be critical to unraveling the mystery of the big bird, for in Chuukese the star Altair is known as *Máánap*. This form shows the variant *-nap*, meaning 'big' with an *n* rather than an *l*. But the word *Máánap* also shows one additional, unexpected development. This word irregularly drops the *i* vowel sound which is found in Puluwatese *Mailap*. Instead, the vowel changes to *áá*, where the diacritics are meant to indicate an *a* sound similar to English 'fat' rather than 'father'. However, in 1967 there was as yet no standard writing system for Puluwatese, and the Chuukese writing system in use at the time did not distinguish the fronted vowel *á*. Without the diacritic mark over the vowel, *maan* is simply the Chuukese and Puluwatese word for 'bird, living being'. Taken together with *nap* meaning 'big' this results in the ascribed meaning 'big bird'. Circling back, Gladwin then ascribes the same meaning to Puluwatese *Mailap*. To reiterate, Gladwin begins with Puluwatese *Mailap*, which in Chuukese is *Máánap*. Ignoring the diacritics this is interpreted as *Maanap*, which Gladwin mistakenly identifies as *maan* 'bird' plus *nap* 'big', thus 'big bird'. Returning to Puluwatese he assumes that the corresponding term *Mailap* must then also mean 'big bird'.

That this mistake went unremarked in the literature for half a century can be attributed to the existence of another Micronesian constellation which is indeed the Big Bird, namely, the constellation known in Woleaian as *Mannap*. Widely known throughout Micronesia and parts of Polynesia, the Big Bird is a large constellation rising in the southeastern sky. The head of the bird is located at Sirius, and one wing extends to Procyon in the east, while the other wing extends to the star Canopus in the far southern sky, an arc of more than 58 degrees. The existence of a Big Bird constellation most likely obscured the error in the identification of *Mailap*. There is indeed a Big Bird; it just isn't located in the East. The 'big bird' is *Mannap*, whereas Altair is not a 'big bird' but rather a 'big *mai*'. What *mai* may refer to remains the subject of much speculation, just as English speakers struggle to explain the *cran* in English cranberry.

Integrating linguistics and cultural astronomy

Up to this point I have focused on errors due to linguistic naiveté. However, linguists are equally guilty of disciplinary narrowness. In particular, linguists too often focus on form rather than meaning. Even some of the very best dictionaries fail to identify all of the constellation names they contain. The massive new edition of the Central Alaskan Yup'ik (Inuit) dictionary translates *qavlunuaq* as "a certain constellation (?) that resembles an eyebrow" (Jacobson, 2012), while the otherwise ethnographically rich dictionary of Dena'ina (Dene) lists ten unidentified constellations (Kari, 2007). Like other areas of traditional knowledge, indigenous knowledge of the sky has generally not been targeted in linguistic documentation projects. Linguists might protest that they cannot be expected to be masters of multiple complex domains of knowledge, and this may be the justification for providing names of constellations without identifying the associated asterisms. However, as indigenous languages are increasingly threatened, it is these

specialized domains of traditional knowledge such as cultural astronomy which are most easily lost. If the linguists who record the names of asterisms do not also work with speakers to identify the associated stars, there is a risk that this knowledge will be forever forgotten..

As Thieberger notes, “a linguist may be the only outsider to learn and prepare materials in a given language and culture” (2012, p. i). Thus, linguistic work with cultural astronomy in endangered languages and cultures is not only an opportunity but also an obligation, given that knowledge of the night sky is rapidly fading across the world. Though linguists are not typically trained in ethnoastronomy documentation, several useful guides are available to assist the willing field worker. Bates & Bostwick (2000) offer some basic guidelines for cultural astronomy research, which can be easily adopted by linguists. In one of the first guides to cultural astronomy research written explicitly for linguists, Holbrook provides concise directions, instructing linguists to ask, “What do people look at in the sky?” (2012). As documentary linguistics continues to mature as a field we will no doubt see increasing emphasis on the documentation of endangered domains of knowledge (Terrell, 2014).

But these advances in documentary linguistics should not preclude the most obvious solution to further progress in cultural astronomy. The two examples described in this paper—the Gwich’in constellation *Yahdii* and the Micronesian star *Mailap*—were uncovered not by lone wolf linguists seeking a “gotcha” moment but rather by teams of researchers and indigenous people working across disciplines. In both cases the collaboration of astronomers, linguists and anthropologists was critical, as was the presence of indigenous researchers who were able to point out what they saw in the sky. When I first asked Micronesian navigator Ali Haleyalur why *Mailap* had come to be confused with the Big Bird, he replied, “you know, I’ve always wondered that myself.” Thus emerged a shared sense of curiosity about the night sky which eventually led us to the answer. This and other examples remind us that translational equivalents may not exist, and that the linguistic details may be more subtle than we suspect. Linguistics thus provides an additional tool which can help us to better understand what people look at in the sky.

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