

Searching for meaning in the Library of Babel: field semantics and problems of digital archiving*

Nicholas Evans

Hans-Jürgen Sasse

En algún anaquel de algún hexágono (razonaron los hombres) debe existir un libro que sea la cifra y el compendio perfecto *de todos los demás*
Jorge Luis Borges, *La Biblioteca de Babel*¹

1. Introduction²

* First published: Digital Audio Archiving Workshop 30 September-1 October 2003, by PARADISEC: Pacific and Regional Archive for Digital Sources in Endangered Cultures. Permission granted by the authors.

¹Given the goal of our paper, the reader will understand why we do not offer a translation.

²This paper was originally prepared for the PARADISEC Digital Audio Archiving Workshop, organised by Linda Barwick and Jane Simpson. An on-line version of that paper, with linked sound-files, can be found at <http://ses.library.usyd.edu.au/handle/2123/1509>. The current version has been revised slightly, and we are grateful to Alejandro Delgado for inviting us to bring it to a wider audience by publishing it here. We would also like to thank Linda Barwick for

Languages are made up of linguistic signs, each of which is a conventional pairing of a form and a meaning³. In spoken languages, the form is sound; in signed languages, it is a visual sign. A central task in documenting any spoken language is to map the structures

organizing the Digital Audio Archiving Workshop, the participants at the workshop for their helpful discussion (and in particular Bill Foley, Nikolaus Himmelmann and Andy Pawley), Leila Behrens for stimulating discussion as we were putting this paper together, and Jane Simpson and a further anonymous referee for their useful critical comments, and Paul Gruba and Anne McLaren for discussion and references on earlier forms of hypertext. Sasse was able to be in Australia at the time thanks to our collaboration on the Volkswagen-Stiftung DOBES project 'Yiwarruj, yinyman, radbiyi Ida mali: Iwaidja and other endangered languages of the Cobourg Peninsula (Australia) in their cultural context', and our work on this project, still in its initial stages, will encounter many of the problems addressed in this paper – we thank the Volkswagen-Stiftung for their generous support. Most importantly, we thank the speakers of the various languages we have worked with over the years for teaching us, patiently, insightfully and often obliquely, about the other word-worlds their languages open up: in the context of this paper Evans particularly thanks Maggie Tukumba, George (Left Hand) Jinawangka, Queenie Brennan as well as fellow Dalabonists Francesca Merlan, Murray Garde and Barry Alpher, and Sasse thanks Panagiota Filaktou and Eleni Kendistou from Markopoulo and especially Stilian Zachariotou, Froso Panagiotou, and Charalambos Katsaros from Kaparelli; many helpful comments by the Athenian Albanologist Titos Jochalas are also gratefully acknowledged.

³This is the traditional position, going back to Saussure (1915), and normally presented in introductions to the field. In fact linguistic signs are better seen as having three parts (Mel'cuk 1968, and Pollard & Sag 1987:51), adding a 'combinatorics' or 'syntax' that gives information about how they can combine with other signs – the English noun and verb 'kiss', for example, have the same form and very similar meanings, but different combinatorics – the noun can take plural *-(e)s*, while the verb can take such verbal endings as past *-ed*, participial *-ing* and so forth. Working out the combinatorics of signs is a crucial part of documenting a language, but is less directly related to the questions we discuss in this paper, which is why we will stick here to the old two-part notion of linguistic sign for expository purposes.

and processes – grammatical, lexical, prosodic and pragmatic⁴ – by which its speakers infer meaning from sound, and produce sound to express meaning. Technological advances in recent decades have steadily advanced our ability to both record and archive these sounds. Yet the other side of language – what these recordings mean – remains problematic, and presents difficult problems for archiving

⁴Here we assume a fairly standard three-fold definition of how meaning is mapped onto linguistic structures:

(a) the *grammar*, comprising both (a-i) *syntax* (ways of putting words together, that allow us to distinguish, e.g. 'Man bites dog' from 'dog bites man') and (a-ii) *morphology* (ways of building up words from meaningful parts, e.g. deriving documentarism – a commitment to documentation, from the verb 'to document', plus adjective formative -ary giving documentary (pertaining to documentation), plus abstract noun format -ism.

(b) the *lexicon* or vocabulary – basically what goes into a dictionary, which is the most significant and detailed repository of a language's meaningful expressions.

(c) the *prosody* – including intonation (melody), stress, rhythm etc., which allows many crucial differences in meaning to be signalled – cf 'John said that.', 'JOHN said that?', 'John SAID that?', 'John said THAT?'. As these examples illustrate, written traditions allow some prosodic contrasts to be represented by punctuation, bolding etc., although no standard punctuational system accurately captures the full range of prosodic choices a language is able to make.

In addition to the above structural means, speaker-hearers make enormous use of pragmatics – the enrichment of meaning through processes of inference out of general knowledge, principles of communication, and specific context. For example, the sentence 'I think we're all hungry' may, in different contexts, be construed as a suggestion to take a break during a conference discussion, or as a proffered apology for scratchy behaviour, or as a suggestion to a solitary eater to share their food: these different interpretations are not part of the structural meaning of the sentence itself, but are additional enrichments drawing on knowledge in particular context. Speaker/hearers of any language draw on all the above in working out what other speakers mean, and in working out what words to choose; a full description of a new language aims to make explicit all these resources, and the way they interact.

that receive insufficient discussion. The worst case – found all too often – is an immaculate sound recording of a passage in language, without translation. For a language about which little is known this is about as helpful as tablets in the Indus or other undeciphered scripts: we recognize that language is there, without knowing what it means. Such cases can result either from language materials that are recorded without being analysed, or through a prevalent asymmetry by which the original text is recorded but not the process of arriving at a translation through subsequent discussion and probing. There are also a range of other less than perfect outcomes, such as translations which are wrong, or too specific (e.g. leaving out alternative translations), or simply uncheckable because it is impossible for subsequent investigators to go back and work out why the given translation was arrived at.

This paper, then, is about why the optimism about ever more accurate ‘capturing’ of speech events that flows from recent technological advances in sound recording cannot be transferred to the realm of meaning, and why the search for meaning in any language is best seen as a never-ending stringing together of hypertextual commentary which gradually leads to a better understanding of the utterances under study. This endless quest has many analogues in the classical interpretive traditions of Talmudic or Koranic scholarship, of medieval commentary on the Greek and Latin classics or on the Bible, of the Chinese commentators on classical Chinese texts, or of scholarly editions of literary or philosophical works, all of which are attempts to provide keys to connotation, allusion, contextual and other shared information necessary for understanding the text. However, when one is dealing with a little-

known language the problem runs even deeper, since there may be no other existing resources, such as dictionaries that give the meanings of the words used, so that the twin processes of documenting basic word meanings (i.e. lexicography) and of constructing interpretive commentaries on texts (i.e. hermeneutics) bootstrap off one another. We will say more about what these classical traditions of hypertextual commentary have to offer the process of semantic documentation of little-known languages in §5.

The asymmetry of sound and meaning in the documentation process is an obvious point and in no way original, but recognizing it clearly has important consequences for how the process of linguistic archiving is organized, so as to set in train the complex and slowly unfolding process by which linguists, and others concerned with documenting little-studied and fragile languages, gradually become able to give meaning to the speech sounds we record.

Our paper is organized as follows. Firstly, in §2, we elaborate on the asymmetry of the linguistic sign, and survey the growing range of techniques that helps us bring meaning directly into what we document. In §3 we illustrate the difficulties involved by examining part of the process of recording, analysing and translating a traditional story in Dalabon, an indigenous and little-documented language of Arnhem Land. In §4 we turn to another part of the world, Greece, with a much longer tradition of documentation, but where nevertheless comparable problems of interpretation arise in making sense of traditional folk poetry in Arvanitika, the variety of Albanian spoken (though now under threat) in parts of Greece. In §5 we step back in time, to show that neither the problem of interpretation and

commentary, nor the solution of employing hypertext, is exclusive to our era: we will examine two ancient approaches to textual commentary, in the Chinese and Jewish traditions, both arguably employing early print approaches to hypertext. Finally, in §6, we draw together these various threads by returning to the question of how this should shape our practice in linguistic archiving.

2. The asymmetry of the sign in language documentation

Charles Sanders Peirce (1930:2.230 ff), the great American logician and founder of semiotics, emphasised the ‘irreducibility of the sign’: it is impossible to reduce a sign to any elements that are themselves not signs. Since *signs can only be defined in terms of other signs*, words can only be defined in terms of other words, and sentences can only be paraphrased, explained, or translated, in terms of other sentences. Ultimately, in linguistic documentation, this principle is played out in the furnishing of translations (e.g. into English) of words and sentences from another language (e.g. Dalabon, Arvanitika), hopefully backed up by definitions of individual words and morphemes in some sort of bilingual dictionary.

When we record a sentence, or a story, we just record a series of sign-*forms*, e.g. the sounds rendered in Dalabon orthography as *walu-no ngorr kah-marnû-yunj* – see example (1) below. Although the ‘original meaning’ may reside in the minds of our story-teller or their audience, our attempts to render the meaning of this sentence will result simply in other sign-*forms*, either in Dalabon (e.g. *nunda korlomomo, ngorr kah-marnû-wong walu-no, nayungHyungki* or some such explanation), or in English, e.g. ‘he (Dreamtime crocodile)

laid down the Way for us (humans, who follow)' etc. In other words, even though the sign has two sides – a form and a meaning – attempts to explicate the meaning of a simple or complex sign merely result in new forms, and in a field situation these secondary forms are typically not recorded directly, but represent an analytic product by the linguist over a number of sessions, discussions in one or more languages, a gradual and cumulative understanding of the grammar and the cultural context, and so forth.⁵

What makes all this possible, however, by opening the key to what at least some of the signs mean, is firstly *the web of use* – hearing, again and again, which signs go with other signs to form larger units, including patterns of paraphrase – and secondly, *the process of ostension*⁶ – of illustrating what some words mean by 'pointing out'

⁵A reviewer for this paper pointed out that, for all aspects of language, including its sound system, we always need contrast and comparison as part of our analysis. For example, we cannot tell from a single recording of a word with the sound [p] what the range of permissible allophones is for that phoneme – does it include voiced [b], or an aspirated form, or a fricativized form, and so forth? In this 'we always need contrast and comparison, and hence context, to determine the significance of linguistic materials of whatever type'. While endorsing this point, we nonetheless feel that the problem is more acute in the case of meaning, because the unbounded complexity of meanings to be expressed, and the existence of complex resources for creating synonymy or fine distinctions of meaning (Mel'cuk et al, 1992), mean that the set of potentially relevant contrasts is much greater in the case of semantics than in phonology.

⁶Wittgenstein (1953:4), in a famous discussion in his *Philosophical Investigations*, cites the following passage from St Augustine's *Confessions* (I.8): *Cum ipsi (maiores homines) appellabant rem aliquam, et cum secundum eam ovcem corpus ad aliquid movebant, videbam, et tenebam hoc ab eis vocari rem illam, quod sonabant, cum eam vellent ostendere*: When they (my elders) named some object, and accordingly moved

from the language itself to objects in our shared world. Within any culture, there are a variety of such *ostensive practices*: holding up to or pointing to objects denoted by terms (e.g. a ghost-gum tree, the nape of the neck, a maggot) or demonstrating or miming particular actions (e.g. a particular way of sitting, or shredding bark), or drawing a diagram in the sand to illustrate a cycle of kinship categories, or the layout of characters camped behind a windbreak. Obviously the process of language documentation should aim to capture as many of these as possible, through field notes, notebook sketches, photographs, GPS readings on site names, or appropriate video clips. The investigator may also collect, curate, and archive such realia as botanical or entomological specimens, or traditional artefacts for museum collections. Getting this material on video does not just help accurately identify the referent of a linguistic expression: it may also illustrate motivations for metaphorical or metonymic extensions of terms, e.g. by zooming in on salient shapes of body parts used in metaphors, or on habitat links (such as particular fish that feed on the fallen fruit of particular trees) that underly 'sign metonymies' by which the same name may be used both for a plant and an animal found in its vicinity (Evans 1997).

towards something, I saw this and I grasped that the thing was called by the sound they uttered when they meant to point it out. But he goes on to warn: 'If you describe the learning of language in this way you are, I believe, thinking primarily of nouns like "table", "chair", "bread", and of people's names, and only secondarily of the names of certain actions and properties; and of the remaining kinds of word as something that will take care of itself.' These observations show the limits to which types of meaning we can 'archive' by appending video clips, photographs etc, however useful these may be in particular cases (e.g. plant names).

Another important aid to translation and understanding must also be mentioned. Every now and then we may make use of parallel texts, which hold meaning as constant as possible across two or more languages, and which form a sort of Rosetta stone for understanding part of how each language encodes meaning: translations of the *Bible*, the *Ramayana*, or *Das Kapital*, are classic examples, but questionnaires, word-lists and video elicitation protocols achieve the same goal.

Useful as they are, such parallel texts only address standardized, universal stories, and fail to explore what is culture-specific, either in terms of stories or in terms of lexical items. Parallel bible or other corpora may tell us how to say 'arise!' or 'Cain fought with Abel'. But we will not encounter the whole subworld of lexical particularities that make a language unique, such as Dalabon *dalabborrod* 'place on a tree where the branches rub together, taken advantage of in sorcery by placing something that has been in contact with the victim, such as clothes, in such a way that it will be rubbed as the tree blows in the wind, gradually sickening and weakening the victim'. The thousands of fascinating words of this type are simply bracketed out from traditions of parallel translation.

In the same category as parallel translations fall questionnaires and elicitation field lists of various types. These have an undeniable utility in making sure that certain areas are covered, and – to the extent that multiple investigators use them – getting comparable data across a range of languages. But no matter how specific they are made – and Sutton and Walsh's very detailed *Wordlist for Australian Languages* (1987) contains such expressions as 'set fire to country

across-wind' (T 77)⁷, 'hunt kangaroos with dogs' (T 79) and 'urine-wet sand'⁸ (G 68) – there will always be a whole vista of unsuspected language-specific words that the investigator needs to reckon with. Standardized prompts need not be verbal, either. Investigators might use sets of photographs or sketches of animal species, or of spatial layouts, or videos illustrating different actions or situations. Or they may get speakers to generate semi-controlled but reasonably naturalistic data in the course of playing 'space games' of the sort pioneered by the Language and Cognition group at the Max Planck Institute for Psycholinguistics in Nijmegen (see Hellwig 2006).

All these methods help give us some purchase on what words and expressions mean, and are particularly helpful in establishing an extensional range that can help peg out the denotational limits of particular signs. Field linguists can get a huge leg-up in the task of establishing meanings in the language they are investigating by the judicious use of such tools, combined with appropriate archiving links between recorded language data and elements of this ever-growing ostensorium. And we can expect technological advances to keep widening the circle of what ostensible elements can be 'captured' – at present, for example, we have virtually no information on smell names⁹ in Australian languages,¹⁰ likely to be important in helping us

⁷The alphanumeric codes refer to query items in their list.

⁸Despite regular enquiries the first author has, to his regret, yet to record a word for this concept in the North Australian languages he has worked with.

⁹Evans thanks Jean-Marie Hombert (p.c.) for directing his attention to this gap in our elicitation methods.

¹⁰The single pioneering example known to us is reported in an early paper by Worms (1942).

understand a range of cultural issues from how love magic works to the process by which edibility and safety of wild foods are assessed. This partly reflects the lack of a standardized stimulus set, and partly the cumbersome nature of lugging it into the field, yet at some point in the future we can expect field linguists to carry a little smell stimulus set, and to have a simple digital code for referring to odour standards in the same way that they now take plant or bird identification books, or Munsell colour chips.

Yet, however far this circle is expanded, there will always be many reasons why ostensive definition is insufficient. Among the more prominent are the following.

(a) *Quine's problem*: how does a learner know what an observed instance of a word used in context refers to? To use Quine's original example (Quine 1960: 29) if you see a white rabbit appear and hear the word *Gavagai* in an unknown language, how do you know if it means '(Lo, a) rabbit!', 'rabbit', 'animal' or 'white'?¹¹ In other words, just showing a video of a stimulus, or a picture of a hopping kangaroo, does not tell us the exact meaning of a word or sentence uttered in its presence.

One problem has to do with attention and characterization: if we hear a word in the context of a woman carrying a dillybag, how do we

¹¹Revealingly, although Quine goes on to consider even further possibilities (e.g., on p. 51, that 'the objects to which this term applies are not rabbits after all, but mere stages, or brief temporal segments of rabbits'), he doesn't discuss the possibility of *Gavagai* meaning 'it hops' or 'it hops in the way a rabbit does', further possibilities to his scenario that are more in line with the *kahmawudmû* example discussed below.

know whether it is a general verb with a meaning like 'carry (in general)', a verb defined by the locus of carrying, such as 'carry (slung across shoulder)' (as opposed to 'carry on head', 'carry on hip' etc.) or a verb that incorporates reference to the thing carried, e.g. 'carry a floppy object'). Since individual pictures or video clips underdetermine the choice of construal, the only way to get around this is to probe the boundaries of a word's meaning by gathering more and more examples, to see if these fall within the category.

A second problem has to do with the problem of where languages find the 'joints' at which they will carve up reality¹²; one subproblem is the question, as W.B. Yeats put it, 'how do we know the dancer from the dance?' If we witness an event, how do we know how it is segmented, conceptually or linguistically, into entities on the one hand, and actions on the other. Say you witness, and perhaps even film, a kangaroo hopping along, and hear a Dalabon speaker say *kahmawudmawudmû* – what do they mean exactly? It turns out that, unlike in English, where we would just use the word 'hop' regardless

¹²There is a lengthy philosophical tradition of dealing with this problem, whose original formulation goes back to Plato in *Phaedrus* (in connection with rhetoric and scientific inquiry rather than cross-linguistic semantics): '[We must seek the principle of] being able to cut it up again, form by form, according to its natural joints, and not try to break any part into pieces, like an inexpert butcher' (Plato 1966). An elegant recent reprise is by David Lewis (1984:227): 'Among all the countless things and classes that there are, most are miscellaneous, gerrymandered, ill-demarcated. Only an elite minority are carved at the joints, so that their boundaries are established by objective sameness and difference in nature.' See also Hirsch (1993) and references therein. These all focus, though, more on entities and qualities than on events, and do not pursue the empirical question of how far languages actually do vary in this domain. Within linguistics the classic examination of how different languages lexicalize event-structure differently is Talmy (1985).

of the macropod species, in Dalabon and related languages there are specific verbs for the hopping of just about every different type of kangaroo and wallaby, and even distinct verbs for the male and female specimens: *kahmawudmawudmû* thus means, roughly 'it hops, in the fashion of a male antilopine wallaroo (macropus antilopinus)¹³ So it would be wrong to assume this should be translated with an entity name like 'macropod', 'kangaroo', or 'antilopine wallaroo': it needs to be translated with an event term, a verb.¹⁴

On the other hand, in another context, e.g. looking at static pictures, or animals in a cage, you might get the actual name for the animal: here *kurdubu*. But this leads to another problem, the *level problem*: now we know it refers to an entity rather than an action, we still don't

¹³This definition is of course unsatisfactory in many ways, since it begs the question of what is criterial, in terms of trajectory, rhythm, 'heaviness', sound of the hopping and so forth, all issues that it would be interesting to investigate e.g. through animated simulations able to vary different kinesic dimensions – one of the hundreds of thousands of questions that need to be pursued before we really know what words in the Dalabon vocabulary mean. Related questions that follow from this have to do with the modelling of the hunter/tracker's knowledge – what do they attend to? – and of the process by which entities are apprehended and classified. Presumably in a hunting situation one identifies the hop/gait (*mawumawudmû*) before actually categorizing the animal as a *kurdubu* – in other words, one categorizes the dance before the dancer.

¹⁴This is an example of where combinatorics assists us in our quest for meaning: the prefix *kah-* and suffix *-mû* are diagnostic of verbs in Dalabon, which immediately suggests we are dealing with a term for an action or state rather than an entity, pointing us towards the 'hop' interpretation and away from the 'wallaroo' one. But this is merely a heuristic, not a proof, since there are many Dalabon words for entities that are expressed by words having the form of verbs: examples are *kah-kolh-djurrhbumû* 'waterfall' or *barrah-danginj* 'two siblings'.

know the level of generality – animal, macropod, antilopine wallaroo? In fact *kurdubu* means, specifically, ‘male antilopine wallaroo’, in contrast to its female counterpart *karndayh*. Again, the level problem cannot be solved by any single act of ostension, but requires us to gather words, contrastively, across a whole semantic field, paying attention to the boundaries of the category, looking out for statements of the type ‘X is a type of Y’, perhaps phrased along the lines, ‘*that kunj* [macropod], *im big name* [i.e. superordinate term], *kurdubu im little name* [hyponym], *(h)e boy one* [male], *that girl one karndayh*’.

A final Quinean twist arises in the case of ‘ideophones’ – words that holophrastically represent a whole situation, with event and entity melded together, e.g. *lerrûngbak!*, which represents the situation of a weapon hitting its target, variously translatable by such expressions as ‘thwack!’, ‘bulls-eye!’, ‘whack!’ etc. Ideophones play a prominent role in Dalabon story-telling, and do not normally allow segmentation although in some cases it is possible, as with *ngurl-wirb!* ‘action, sight, sound or sensation of a heart being plucked out’ which can be broken down, by morphological analysis, into the roots *ngurl* ‘heart’ and *wirb* ‘plucking’.

There are other thorny issues besides Quine’s problem.

One is how to get at the meaning of terms that don’t allow visual (or other sensorily perceptible) depiction. Terms denoting intentions or thoughts are one example. Words for things that *don’t happen* and therefore *cannot be shown* are another: an example is the Dalabon verbal prefix *molkkûn-* ‘do, or happen, without the appropriate people

being informed or knowing', which can be used in contexts spanning such situations as someone dying without their relatives knowing, a trespasser visiting a site without due permission, visitors turning up unannounced, or water being present beneath a rock without thirsty people suspecting its presence.¹⁵

A further problem has to do with representing metaphorical or metonymic extensions, which often reach out from relatively tangible and depictable base-meanings to more intangible extensions that are hard to portray by visual or other means. It is not hard to sketch or photograph a *djadj* '(woman's) digging stick' or *borndok* '(man's) woomera, or spear-thrower', but much harder to depict the metonymic extension of these terms to the respective birth-places of women or men which are denoted by such terms as *djadj-no* 'her birthplace' or *borndok-ngan* 'my birth-place (uttered by a male)', let alone to film the practices (of burying the respective symbolic implements, along with the afterbirth, at the place of birth), which are now scarcely carried out, if at all, and in any case shrouded with cultural sensitivities. (Up to the time of writing, it has been deemed OK to talk about these things publicly; should this change in the future, we apologise to the sensitivities of future Dalabon readers.)

There are also difficulties in representing *construal* through external portrayal of examples. For example, in Kayardild, there is a suffix *-ngurrnga*, added to directional terms based on compass points, meaning roughly 'beyond a significant geographical discontinuity'.

¹⁵For actual Dalabon examples, see the entry for *molk-kûn* in Evans, Merlan & Tukumba (2004).

Thus *ringurrnga* [east-*ngurrnga*] can be used for an island, emerging from the sea to the east, but also to a stand of mangroves, or sandhills, as one leaves a saltpan travelling east. Though it is possible to photograph or map particular instances of *ringurrnga*, the underlying meaning – what is construed as a significant geographical discontinuity – cannot simply be taken for granted, or immediately inferred from a couple of instances, and to really get to the bottom of it we need to probe an open-ended set of examples.

Related to this is the problem of context: external context may be ‘capturable’, and one could in principle add different camera angles, linked compass points to show spatial layout, scaling indicators, down to an imaginable plethora of detail that might ultimately include ambient temperature, for example. But capturing social context is much more problematic, since it involves representing what is known, and what is being attended to, by all participants, probably from a culture that is far from perfectly understood. Consider kinship as a simple example: we might know that the Dalabon word for ‘my wife’ is *kirdikird-ngan*, and have recorded the fact that A and B are married, then notice that A, apparently talking about his wife B to another woman C, uses the term *kundjirr*. Understanding this use requires us to add, to our representation of the social context, the information that C is B’s sister: *kundjirr* means something like ‘my wife, who is your sister’ or ‘my husband, who is your brother’. This is a simple example, and a full understanding of systems of triangular kin terms in Arnhem Land languages,¹⁶ which may run to over a hundred terms, requires an understanding of all kinship relations

¹⁶For discussion of such systems in the Central Arnhem Land area see Merlan (1989) and especially the detailed discussion of situational pragmatics in Garde (2003).

between all participants in each transaction – information that is typically in the heads of each member of the recorded session, but unlikely to be known in its entirety to the investigator, who may thereby be unable to understand why a given kin term has been chosen.

For all these reasons, there will always be problems of meaning that lie beyond the scope of what can be recorded. Despite the accelerating ostensive revolution that is making it possible to record more and more of the physical context in which speech occurs, and which will allow us to link recorded material to photographs or video clips in ways that vastly improve the semantic accuracy of our documentation, a large proportion of the interpretive process will always lie outside this circle of light, and our procedures for archiving must take this into account. We now turn to two examples, each illustrating the complex process by which meanings are given to recorded material.

3. Capturing sound vs working up meaning: an example

To understand a sentence means to understand a language.
Wittgenstein 1953:81¹⁷

¹⁷This sentence is cited approvingly at the beginning of Pete Becker's classic essayistic analysis of how to interpret a single sentence in classical Malay, which appears as a chapter in Becker (1998). Both the essay and the whole collection touch with great depth and insight on the problems we are discussing in this paper.

As our first example we consider the problem of furnishing glosses, and a translation, for a Dalabon mythical text recorded by one of us (Evans) from Maggie (Ngarridjjan) Tukumba at Mobarn (Blue Waters Outstation) in Central Arnhem Land (not far from the community of Bulman) on 17th July, 2003, in the presence of her husband George (Balang) Left Hand Jinawangka, with younger family members coming and going in the background. The text was recorded on cassette tape (Tape Reference Dal 2003.7), with accompanying notes during, before and after the story, but no video recording.¹⁸ Readers wishing to hear this text should check out the sound files linked to the on-line version of this paper (see URL in Footnote 2).

The process of working up recorded material involves three stages:

(a) the recording of the speech event as an audio or video stream

(b) annotation of that event with a transcription, free translation, morphemic analysis, morphemic translation, gloss in context, syntactic category notations etc., in a time-aligned multi-tier annotation.

(c) the presentation of that material on paper or screen, or the preservation of some annotated event in an archive.

¹⁸Like many recordings, this was opportunistic rather than planned, in the sense that the planned purpose of this session had not been to record stories at all, but to check verb paradigms, take an initial stock of reciprocal constructions in the grammar, and investigate the vocabulary of memory and forgetting in Dalabon, but on the day the relevant people felt like story telling.

Though we will focus mainly on (b) in this section, in practical terms much of the older material that we have available on Aboriginal languages is only accessible as (c) – in other words the publication has often been used as the archive, with the (b) stage being invisible or undocumented, so that there is a washback from decisions about (c) to the publically visible traces of (b). We therefore include some remarks about (c) in addition to (b), which is our main focus, despite the increasing recognition by those involved in linguistic documentation of the importance of keeping these two stages distinct.

The text to be focussed on in this section, which, we will call Korlomomo and Berrerdberrerd¹⁹, tells of how humans came to have fire: in the original or dream-time when the story is set, only the freshwater crocodile (Korlomomo) had fire to cook with, until Berrerdberrerd (Rainbow Bee-eater), one of the various birds who were human forebears, managed to steal it away.

Temporarily considering stage (c) of the process mentioned above, a presentation of this text for public consumption might take several forms. For example, it might contain (just) an English translation (as in the Berndts' collection *The Speaking Land*), facing pages with

¹⁹Dalabon stories do not appear to have fixed, conventionalized titles, but will often be referred to by combining a demonstrative with the name of one protagonist, e.g. 'you know, that Berrerdberrerd (story)', 'old man, tell that Korlomomo (story)', etc. In Evans' experience, such references, though they may pick out different protagonists on different occasions of use, do not make use of the conjunct form common in English titles (Abel and Cain, Goldilocks and the three bears), so the term Korlomomo and Berrerdberrerd is in this sense an accommodation to European cultural norms.

Dalabon and English versions (1 shows how a portion of this text would then be displayed), or (typically in linguistic publications) a version combining the vernacular version, divided into morphemes, with a line showing interlinear glosses, and a further line giving a translation (as in 2, to which we also add a line giving a phonetic transcription using phonetic symbols in addition to the transcription in the recently-established practical orthography that employs only Roman letters, and which we will use elsewhere in the paper).

- (1) *nunh manjh ngong, njerrh-no ngurrah-nguy, djenj, munguhdjam, nunh mak, nunh mak ngurra-kinji, kurlba-no-dorrunggh ngurrah-nguy njerrh-no ngurrah-dja-nguy, bah, walu-no ngorr kah-marnû-yunj, kanunh .. berrerberrerd-yih, kanh lad bukah-yemey*

Like any sort of meat, we would have eaten it raw, or fish, or whatever, we wouldn't have cooked it, but would have eaten it dripping with blood. We would still just be eating (meat) raw, but Berrerberrerd the Rainbow Bee Eater made that new way for us, he snatched away the firestick from Korlomomo the Crocodile.

- (2)
- | | | | | | | |
|--|------------------------|-------------|------------------------|------------------------|---------------------|-------------------|
| <i>nun?</i> | <i>man?</i> | <i>ɲoŋ,</i> | <i>ner?</i> | <i>ɲura?</i> | <i>dɛn</i> | <i>mupu?</i> |
| DEM ²⁰ | meat- | all | raw ²¹ -ADJ | 12pl/3-As-eat-IRR | fish | whatever |
| 'like any sort of meat, we would have eaten it raw, or fish, or whatever, | | | | | | |
| | | | | | | |
| <i>nun?</i> | <i>mak,</i> | <i>nun?</i> | <i>mak</i> | <i>ɲura?</i> | <i>gu banodoru?</i> | <i>ɲura?</i> |
| DEM | NEG | DEM | NEG | 12pl/3-cookIRR | blood-3POSSD-with | 12pl/3-AS-eat-IRR |
| 'we wouldn't have cooked it, but would have eaten it dripping with blood. | | | | | | |
| | | | | | | |
| <i>ner?</i> | <i>ɲura?</i> | <i>ba?</i> | <i>waluno</i> | <i>ɲorga?</i> | | |
| raw-ADJ | 12pl-AS-just-eat-IRR | but | custom-PART | 3/12As-BEN-putPP | | |
| | | | | | | |
| <i>ganun?</i> | <i>bere?bere?ji?</i> | <i>kan?</i> | <i>lad</i> | <i>biga?</i> | | |
| DEM | rainbow.bee.eater-INST | DEM | firestick | 3/3hiAs-snatch.away-PP | | |
| 'We would still just be eating (meat) raw, but Rainbow Bee Eater made that (new) way for us, he snatched away the firestick from him (Crocodile).' | | | | | | |

3.1 The subtitling illusion

Bilingual editions of published texts can easily foster the illusion that both languages – the recorded vernacular, and a language of wider use, such as English – have equal status, appearing confidently side by side.²⁰ Whatever the level of pairing we look at – between sentences or passages in the recorded language and their translations in English, or between individual morphemes like *njerrh-* or *-h-* and the morpheme glosses paired with them in interlinear translation²¹ –

²⁰For developments on the computational side that decisively reject this illusion, and make the asymmetry that we are discussing in this paper computationally explicit, see the work by Bird and Liberman (2001) and Bow, Hughes and Bird (in prep.) on annotation graphs.

²¹There are other solutions, of course: a commonly adopted one in text collections made in the 1940s and 1950s was to use word-by-word translations rather than glosses. Thus instead of '12pl-AS-just-eat-IRR' we might have written 'we.would.have.eaten.it'. This solution has the advantage of being more transparent to the non-linguist, and also to be available at earlier phases of analysis before the exact contribution of some obscure grammatical morphemes has been worked out, but on the other hand it is less 'accountable' in linguistic terms: the basic premises of glossing are that (i) every morpheme should be accounted for by being identified and given a unique and consistent label (ii) this label should be emic, suiting the categories of the language being described, which may not always correspond clearly to English terms, and (iii) the process of accounting for how the assembly of morpheme meanings – simple signs – into a translation for the whole word or phrase – complex signs – is not undertaken by the glossing process itself, but by a grammatical description and lexicon which are produced in parallel to the analysis of the text, traditionally by producing a

this appears to reproduce our familiar two-part linguistic sign, with the Dalabon material being the form or signifier, and its English translation being the meaning or signified, with the distinctions in level (sentence or passage vs morpheme) corresponding to a difference between complex and simple signs.

This apparent equality we will term the subtitling illusion – the view that somehow the English version comes into existence in a similar way to the vernacular version, perhaps by retelling the story in English after telling it in the vernacular. And this illusion then feeds a view that, in archiving texts, the vernacular and English languages have equivalent status as primary archival objects. In fact, however, the linguist's usual experience is that he or she merely records the vernacular text, which thus fits our usual conception of an archival object, in the sense of being a time-bound, continuous, tangible and fixed 'capturing', though to the extent that the recording additionally contains the informant's translation or discussion of the text this is also part of the primary archival object. In other words, *in all cases the primary archival object is simply what you can hear.*²² The

'Boasian trilogy' of linked and mutually consistent and cross-indexed text collection, dictionary and grammar – Jeff Heath's three-volume trilogy for Nunggubuyu (Heath 1978, 1982, 1984) is the best-worked-out example of such a trilogy in the Australian context.

²²Peter Austin, in commenting on the oral presentation of this paper, suggested a more optimistic formulation, based on the possibility of employing video as well: *the primary archival object is everything that you can see and hear*. While it is obviously optimal practice to include visual recordings as well, and hence the addition of a visual modality still makes sense, we would still prefer the more pessimistic formulation *the primary archival object is **just** what you can see and hear*, to emphasise the absence of translation, other interpretative clues and so on, from the primary archival object itself.

process of working up a translation, on the other hand, is much more fragmented and open-ended, pointing both backward to earlier recordings, analyses, and insights, and forward to questionings, analyses and attempts at translation that may continue to be worked through for a considerable and in principle unbounded time after the recording of the original vernacular text.

3.2. The manifold sources of translation

We now survey the sources on which a translation can be based: fragments of rendition, before and afterwards, in English and/or Kriol (§3.2.1), the accumulated understanding, by the investigator, of how the language works (§3.2.2), information from gesture (§3.2.3), relevant information from tellings of the same story by others (§3.2.4), other contextual information that was not recorded but is relevant to the translation (§3.2.5), and subsequent interpretive remarks made after the story (§3.2.6). All these go into the fashioning of an English translation, which remains an open-ended process since even after integrating all of the above many unanswered questions remain.

3.2.1 *Fragments of versions in English / Kriol*²³

²³The transcriptional decision as to whether to represent such speech as Kriol (using Kriol orthography) or as Aboriginal English (using English orthography, with more or less adjustment to phonetic substitutions) is a fraught one, in view of the intergraded continuum stretching between the two poles of standard English and 'deep' (basilectal) Kriol, but it immediately influences the reader's perspective. Our adoption of a more English-like representation here – albeit using Kriol spellings for words that are either

Although, as mentioned above, it is not the case that an exact translation of the text was given at any one point, renditions of parts of it, into English and/or Kriol, were given before and after the Dalabon telling, by the story-teller herself (Maggie Tukumba) and also by her husband, George Jinawangka²⁴, who had been encouraging and prompting her to tell the story.

As part of the lead-up to telling the story in Dalabon, George Jinawangka, who had previously recorded another story in Rembarrnga, then suggested the Berrerdbererd story to his wife, sketching out parts of the story in English / Kriol, with occasional comments and amplifications from Maggie. This discussion appears at an earlier point on the same tape. It is not exactly a translation, since it contains only part of the material in the Dalabon version, and includes other material not in the Dalabon version, such as the section *getimbad everything, go back la water* that describes the

lacking in English, or receive a radically different pronunciation on the tape – is in the interests of immediate comprehensibility to readers who don't know Kriol. On balance, however, the speech in this conversation and others is squarely within the Kriol part of the continuum.

²⁴Whereas Dalabon is clearly Maggie Tukumba's mother-tongue, for George Jinawangka it is his third or fourth language, which he speaks well, but not perfectly, and more importantly, which he is not deemed to have the social authority to make legitimate comment on (see Evans 2001, and references therein, on the differences between *speaking* and *owning* a language in these contexts). His mother-tongue is the Yolngu language Djinang, but from the age of seven or so his main language of everyday communication was Rembarrnga, with Kriol and to a lesser extent Kunwinjku used for wider communication. Within their household, Maggie and George speak a mixture of Kriol, Rembarrnga (mainly used by George) and Dalabon (mainly used by Maggie). In Evans' judgment, Jinawangka's knowledge of Dalabon is very precise and wide-ranging, making his commentaries accurate and dependable, though limited to what can readily be explained in Kriol rather than English.

behaviour by crocodiles, and of people at that early time, of leaving the water to hunt and then going back underwater. An excerpt from this lead-up is reproduced below.

(3)

- G *And that alligator, alligator, crocodile, <M: jadan²⁵> today, crocodile, we, like we shoulda bin <M: that shoulda> today like im, like a man, <M: yeah> people, they wubina²⁶ lagijat²⁷ now, like the crocodile*
- M *like the crocodile*
- N *yeah*
- G *puttim camp, like, la riva, la water, underwater we sidaun²⁸, we bin andi sidaun like that now, just walk around today.... getimbout everything, go back langa²⁹*
- M *Go back sleep lang water now*
- G *La water again, and sitdown langa water, jilip³⁰ langa water, and that's the rule we bin andi follerim tudei, but that berrerd berrerd imin pullimout im³¹ firestick*
- M *imin helpim wi³²*
- G *imin helpim blang people like then lagijat*

As this example indicates, quite apart from the non-isomorphism of this passage with material in the actual text, the variety of Kriol in

²⁵*Jadan* is Kriol for 'that one'

²⁶*Wubina* is Kriol for 'would have been'.

²⁷*Lagijat*: 'like that'

²⁸*Sidaun* (< Eng. sit down) 'live, remain, be'.

²⁹*Langa, lang, la*: variants (< Eng. 'along') for the general locative marker in Kriol: in, at, on etc.

³⁰*Jilip*: sleep.

³¹*Imin pulimaut im* 'he pulled it out'

³²*Imin helpim wi*: he helped us.

which it is cast, with such constructions as *we bin andi*³³ *sidaun like that now* for 'we would have lived that now', or *we bin andi follerim tudei* 'we would have followed today', necessitates some translation itself into standard English, unless Kriol rather than English is used as the target language.

An important point to stress from this pre-story warm-up has to do with performativity. Storytellers are often quite directive about when to let the cameras roll, and Maggie and George had already been a bit reluctant for the (very small) recorder to be on during this discussion, which they regarded as preliminary. Had we set up a video-camera as well, it is likely they would not have wanted it switched on yet, since they hadn't yet settled on the worked-out version of the story for Maggie to tell. As a consequence, there can easily be material that doesn't make it into the recording, but which certainly needs to be taken into account in working up the translation.

3.2.2. Accumulated prior understanding of word and morpheme meanings by the investigator

It is unusual for a story simply to be told in a vacuum, to a listener who does not already know the language to some extent. Certainly this setting would not be likely to evoke a virtuoso performance, as so much would be lost on the listener. The storyteller, therefore,

³³In this variety of Kriol the modal auxiliary *andi* (< *want him / want it*) is used as an irrealis marker, while *bin* (< English *been*) is the past tense marker, so that 'would have Xed' is rendered as *bin andi X* – note that, with respect to English, the order of past and irrealis marking is reversed.

naturally assumes that a lot of what they say is immediately understandable to the linguist already, and is therefore not in need of translation. And the linguist – who may not have any choice about it, anyway – typically accedes to this assumption by only asking about obscure or difficult passages, and working the other bits out for themselves.

This process draws both on prior grammatical analysis, and on an evolving lexical file. In the present case, the investigator (Evans) had already worked out many aspects of the language's grammatical structure (see e.g. Evans, Brown & Corbett 2001, Evans & Merlan 2003), as well as drawing on some prior published and unpublished work by others (Capell 1962, Alpher 1982), and together with Francesca Merlan, Maggie Tukumba and others had already produced a first dictionary of around 3,600 entries (Evans, Merlan and Tukumba 2004). This enabled an initial understanding of much of the text, without requiring a special translation from the story-teller. For example, the system of pronominal prefixes for subject and object is now clearly understood. So is the use of the benefactive applicative (the prefix *marnû-* in (2)), which adds a beneficiary to the verb's basic argument structure, converting the two-place verb *yunj* 'put (down, or in place)' into the three place verb *marnû-yunj* 'put down, or in place for'. Understanding this, plus the system of pronominal prefixes, plus the word *walû-no* 'law, way, custom', allows us to translate *ngorr kah-marnû-yunj* as 'he put it in place for us'.

At the same time, though, every text potentially revises the understanding we have of how a language works, particularly in the early stages of investigation. Consider the *h*-final forms of the

pronominal prefixes, glossed in previous publications on the language (e.g. Evans et al 2001) as 'Realis', i.e. as coding a real as opposed to a hypothetical or negated situation. This particular text forced Evans to revise his understanding of this form, since a sentence like 'we would still just be eating it raw' is clearly hypothetical and hence not compatible with the gloss 'Realis' (note that, at the other end of the verbal word, the Irrealis suffix is being used). As a result, the revised gloss 'As(ertive)' is used: this covers main clause, non-negative assertions, whether realis or not. In this case, we didn't really need detailed discussion from the story-teller, since the story's context makes the overall meaning quite clear: it's rather a matter of adjusting the existing body of grammatical analysis to make it consistent with a text whose meaning (on this point) is quite clear.

More commonly, texts throw up distinct lexical items that have not been encountered before, and that require translation: typically these are cobbled together as one replays the recording to the story-teller, stopping at the difficult parts. Consider (4), a further excerpt from the same text.

(4)

*bûkah-djam.. bûkah-dja-men-**werreminj** bûkah-dja-marnû-kedjakminj*
3/3hiAs-HES 3/3hiAs-just-mind-sweetenPP 3/3hiAs-just-BEN-return.overPP
'And he.. he just won him over, he just kept coming to him over and over,

dord bûkah-marnû-naninj, bûkah-dolku-boyoboyohminj
louse 3/3hiAs-BEN-lookPI 3/3hiAs-back-ITER-rubPP
'He groomed him for lice, he rubbed his back,

The overall import of this line is clear, from elements of the pre-story discussion, and from what we already know of the language:

Berrerdbererd, attempting to remove the firesticks from the crocodile's jealous grasp, attempts to distract him by grooming and massaging him. The second line is quite clear, owing to previous recorded uses of these words for delousing (*dord bûkah-marnû-naninj*) and for massaging or rubbing parts (*bûkah-dolku-boyoboyohminj*; the first time the verb was recorded was in the context of a male frog arousing a female frog by massaging her belly during mating). But the exact meaning of *bûkah-dja-men-werreminj* is not clear yet. Maggie furnished the explanation 'he bin sweeten him' in discussion on replay of that part,³⁴ but the exact meaning of 'sweeten him' is not 100% clear – is it simply 'distract', with the notion of pleasure and seduction being a mere feature of this specific context? Our dictionary already has a meaning 'rub out, efface' recorded for the verb *werremû*, so that incorporating the root *men* 'mind' into this would naturally give the sense 'distract' (i.e. efface someone's mindfulness) without entailing the seduction implied by 'sweeten'.

3.2.3 Gesture

As mentioned above, this story was recorded only for sound, yet there are several places where accompanying gestures enter into the translation process; we consider two.

³⁴This comment was not recorded, since the recorder was being used to replay the tape, but written into Evans' first rough transcription made after the telling of the story. Obviously best practice is to have two recording devices, one for playback, and another for recording comments on playback.

The first gesture (not recorded, but noted down subsequently) accompanied the line

- (5) *bah* *berrerdberrerd* *kah-dja-bo:ng*,
but rainbow.bird 3As-just-goPP
'But rainbow bird just went',

This line actually depicts the point when Berrerdberrerd dives down into the water to grab the firestick, but the actual verb used is just *bong* 'went'. However, while saying this the storyteller made a diving gesture with her hand, so that a better translation would be 'just went (down, like this – with accompanying gesture)' or, more freely 'just dived down' – strictly speaking, the choice depends on whether one is simply translating words, or translating integrated multimodal communication. Note that at the corresponding point later in the story, when Berrerdberrerd flies up out of the water with the firestick, the speaker used a combination of path verb (*dolkang* 'went up'), a locational adverb (*karrh* 'up(wards)') and gesture (a straight arrow-like movement of the hand at an angle of 45 degrees).

The second gesture accompanies the 'pre-discussion' rather than the main performance (see §3.3.1), so it may well have been lost anyway had video-recording been confined to the main performance.

In the main Dalabon version of the story, Korlomomo is described as holding the fire in the following way:

- (6)
lad *bûkah-yemey*, *lad* *kanh* *ka-yidjjaninj* *kanh* *korlomomo-yih*

firestick 3/3hiAs-snatchPP firestick DEM 3/3-holdPI DEM crocodile-INSTR
'He snatched the firestick(s) from him, the firestick(s) that the crocodile was holding onto.'

Note that this remains non-committal about how or where crocodile had the firesticks – in fact, since *yidjnjan* can mean 'have' as well as 'hold', it could also simply mean that Korlomomo had the firesticks somewhere inaccessible, without yielding them up. It's also non-committal about the number of firesticks, since Dalabon does not obligatorily mark number for non-humans, so either 'firestick' or 'firesticks' are acceptable translations from the actual Dalabon words. However, before the main part of the story-telling began, George made the following remark:

(7) *Lagijad now, yeah.. 'e bin oldei havim that two side, fire, and no larrim go*³⁵

At the same time as he said this, Maggie illustrated the crocodile's action, by bringing both her upper arms close to her flanks, as if hunched in claspng a firestick to each side of her body, under her arms. A rendition of this into verbal translation would therefore state something like "He snatched the firesticks from him, the firesticks that the crocodile was holding with his arms against the side of his body.'

3.2.4 Information from other tellings

Many recorded stories are told, in slightly different versions, by a range of story-tellers from the region. A version in Kriol, for example,

³⁵I.e. 'like that now, he kept holding the firesticks on both sides, and wouldn't let them go'

was recorded by John Sandefur from Queenie Brennan, and appears in his 1982 course *An Introduction to Conversational Kriol*. Significantly, the accompanying cassette includes Queenie Brennan's Kriol version, which corresponds to the written Kriol version in the book (Sandefur 1982:61), while the English translation on p. 62 does not have a corresponding recording. This version includes many details not present in Maggie Tukumba's version, such as the fact that a number of other birds had tried unsuccessfully to wrest the firestick, before Berrerdberrerd (known as Kingfisha in the Brennan version). Clearly it would not be appropriate to include these in the translation of Maggie Tukumba's version. But it does also include phrasings which support the more precise translations mentioned in the preceding section, as diving or coming down rather than just 'going', through the wording *imin kamdan* 'he came down', and as 'holding' or 'clutching' against the side of his body, through the use of the wording *imin oldei nesimbat tu dat faiya* 'he kept holding on tight to that fire'.

3.2.5 Other contextual information, not recorded on tape

Another part of the text contains the phrase *dubmi ngarra-dja-yongi wah-kah, nunda kahyin ngarra-dulhmun*, literally 'now/today we would just sleep in the water, like now when we are cold'. This does not make a lot of sense as is: there is a problem deciding how to translate *dubmi*, which can mean either 'now' or 'nowadays, today', and the form *ngarra-dulhmun* is not in the expected irrealis form (*ngarra-dulhmini*) that would express the continued hypothetical stance 'we would be cold'. When Maggie and George were asked about this, George explained *nunda kahyin ngarra-dulhmun* as 'like

this now when we're cold'. But this doesn't make much sense either, unless the fuller context of both the story and his explanation are taken into account: the story was recorded in July, the cold season, and over the last couple of days both had been complaining about being cold and not having enough warm clothes or blankets – a presumed recoverable allusion which underlies the remark in the story. Only when we have this extra contextual information can we come up with the proper full translation: 'so that today we would just sleep in the water, cold like now in the winter time'.

3.2.6 Subsequent interpretive remarks gathered over days after the telling

It is unusual to grasp every detail of a text at once. In the case of this story, the main recording and transcription sessions left certain things unanswered, which Evans discussed on and off over the next few days. These elucidations were not always in recordable settings, since certain other types of contexts, such as walking down to the river to fish and seeing a *berrerdberrerd*, or driving along a bumpy track in a car, often lend themselves well to this sort of discussion.

One issue has to do with why it should be *berrerdberrerd* rather than some other bird who is credited with taking the firesticks. When this question was raised, Maggie answered that you can tell because he has a firestick in his tail which he knocks against trees calling out "*berrerdberrerdberrerd...*" This is relevant not so much to the translation itself, as to the 'just so' issue of the story, validating it by invoking some aspect of the present which it explains.

A second question has to do with an apparently illogical aspect of the story: if Crocodile lived under the water, how come he could light fires there? In answer to this question, George used the Dalabon word *kah-burmu*, which can mean either 'be smoky' or 'be misty, foggy', tying the contemporary fact that mist can be seen above the water in rivers, especially in the cold season, to the crocodile's underwater cooking fire. Again, this does not affect the translation per se, but does supply additional interpretive material that helps make sense of the story.

3.2.7 Drawing together the threads

As the preceding discussion shows, the translation of a text is put together from many pieces, integrating material from a range of occasions, some recorded and some not. It is also an ongoing process: although a provisional glossing and translation for the full story is provided in Appendix A, many unanswered questions remain and the translation is likely to change through the coming years, as it already has several times since the text was initially recorded. Through the life-time of a language documentation project, the construction of textual interpretations and the compilation of a dictionary and other resources that fix lexical meaning in a standardized way will feed one another. Over a period of decades, new texts lead to the revision of lexical entries. And new discoveries of lexical meaning lead to the revision and sometimes retranslation of previously recorded texts.

Clearly the ideal, from the point of view of future investigators critically assessing the evidence on which the translation is based,

would be to include as many links as possible to other relevant recorded material: the more links to these are made, the more defensible the translation will be. But this is merely a matter of successive approximation: though recording of context can be expanded, e.g. through video, or recording commentary on text, it is illusory to think all context will always be recorded.

The provisional and evolving nature of translations makes them much less stable, as an archival object, than the original vernacular text, so that, ideally, we need to allow for successive translations, or glossed versions, to be linked to the original sound file.

4. Problems of Interpretation in Arvanitika Folk Poetry

Turning now to a different part of the world, we will present several examples from Arvanitika, the almost extinct Albanian-based language of the descendants of Medieval immigrants to Greece, on which Sasse has been working for almost 40 years (see, in particular, Sasse 1991). Arvanitika is extremely rich in traditional folk poetry. One of the main problems field researchers are confronted with when analysing the folksongs volunteered by Arvanitika informants is the fact that their topics often refer to specific cultural knowledge not necessarily available to the entire community. This then raises the problem of how to archive this esoteric knowledge, if only as metadata links, that can furnish the resources needed for a full interpretation.

The problem of esoteric cultural knowledge is particularly true of older stereotyped stanzas which frequently occur woven into more

recent creations. Considerable interpretive skill, detailed information on cultural traits of the past, and specific historical knowledge about local politics and topical events is sometimes required to come to grips with the meaning of a particular verse, of course in addition to the mere linguistic problems that older speech forms may pose. In a speech community like the Arvanitika one, where fluent speakers have become rare and knowledgeable persons with a good memory of the earlier cultural context are even rarer, the interpretation of such material becomes a joint "hermeneutic" act in which both a considerable number of community members and the researcher himself participate. The following examples represent different types and different degrees of such hermeneutic problems. Translations are as literal as possible, to best illustrate the types of difficulties that arise.

Consider first the following two lines from a love song that Sasse recorded in 1970 in a place in Boeotia called Kaparelli, where Arvanitika was still thriving at that time:

(8) *Dhjozma e-thuriturë,*
Çë më rri mëriturë?

Mint-plant, fenced-in,
Why do you sit so sorrowful?

When Sasse was transcribing this song, several elders were sitting around explaining it to him. This was his first initiation into an entire universe of herb metaphors, which later turned out to be very typical of Arvanitika love poetry. Herbs and spices generally symbolize female beauty, but every single herb has a special characteristic,

corresponding to its location or its use. Probably the most widely used metaphor is *vasiljiko* 'basil', which was usually kept in pots, on one's balcony or one's veranda. Consequently, *vasiljiko* is often used to symbolize a beautiful girl who shows herself in public. This is not so with mint-plants. These were kept in the backyard, and Arvanite gardeners would usually construct a fence around them to protect them from animals. The protected mint-plant has thus become a symbol for a beautiful unmarried girl, locked in the house, difficult to talk to for the courting lover, but also herself longing to get out and talk to the handsome passer-by. This explains the participle *thuriturë*, meaning something like 'having a fence around it', from an old verb *thuris*, or *thurinj*, not very frequently used in present-day Arvanitika.³⁶

The next four lines come from a different song, recorded and analysed during the same period.

- (9) *Kata i pari ndë Kundurë*
Bëri di tri pjata e grurë.
Kata i pari ndë Hase
Bëri grurë trimise.

The very first (man) in Kundura
Made two-three plates of wheat.
The very first (man) in Hasia

³⁶We should add here that the interpretive discussion was not recorded on tape: just a few notes were scribbled on the margin of the song's transcription. At that time, many of us were less aware of the inestimable value of such commentaries than we are now more than 30 years later. We would now archive the discussion along with the song, especially given the fact that some of the information omitted in the written notes may be irretrievably lost by now.

Made wheat three-and-a-half.

“The very first” refers to the richest man in the village. Kundura was a small Arvanitika village in Attica, which has long been abandoned. It was translated into Greek by the informants as ‘Paleokundura’, and may be found by that name on old maps up to the 1950s. The census of the Hellenic Statistic Service indicates that it still had a few inhabitants approximately fifty years ago. For a long time – the explanation runs – people had been living in such misery in that village that the village had become a symbol of extreme poverty. But even the richer villages were not much better off, and this is what the song intends to indicate: Hasia was considered a thriving village, and it still exists as a suburb of Athens; in spite of that there was not much difference in the income of the richest man in Kundura, who harvested just two or three plates full of crop, and the richest man in Hasia, who came up with three and a half. Interestingly, there was a dispute among the informants as to whether *trimise* may also mean ‘three halves’, i.e. ‘three half plates’. This was rejected, as it does not make sense given the traditional associations, although the phrase *trimise* probably admits this ambiguity.

The next two lines, again from a love song but recorded many years later, caused a lot of discussion among the informants.

(10)

*Kaljirjote me surme,
Trandafilje ndë podhe.*

Kaliriotisses with kohl,
Roses in/on the apron.

Who are the *Kaliriotisses*? Women obviously, because the form is feminine. All that the informants were able to contribute was that the *Kaliriotisses* were the 'beautiful Arvanite women wearing their traditional Sunday dresses'. The word *surme* was also unknown. Also, it was unclear whether the roses were decorations on the aprons (embroidery), or whether they refer to roses gathered and held in the apron as a container – the vague locative semantics of the preposition *ndë* allows both readings. Left alone by the informants, Sasse eventually found the solution to most of the problems entirely by chance in an old Greek encyclopaedia (Eleftheroudakis, 1932 edition): It says that in the early 19th century, one used to designate, as *Kaliriotes* (m.) or *Kaliriotisses* (f.), the upper-class Athenians who lived in a quarter of the town named after a fountain called *Kaliroi* (lit. 'good fountain'). The word *surme* turned out to be of Turkish origin and was used for what is commonly called 'kohl', the cosmetic powder traditionally used (especially in Muslim countries) to darken the area around the eyes. The pages of the encyclopaedia were copied and added to the field notes file, good candidates to be electronically archived as commentary material. Of course, to the extent that the relevant materials already exist in the public domain, this is really a matter of creating links to resources archived elsewhere. However, to the extent that old or rare material in some countries may not be dependably archived and retrievable, there may be cases where it would be appropriate to archive this material directly as data, provided that problems of copyright can be overcome.

The question of whether the roses were gathered in the apron or whether they are embroidered was not pursued, but it can easily be found out what these old costumes looked like, and a photo could go into the archive as well.

To conclude this section we cite one last example to illustrate a case where it was impossible to get a reasonable interpretation. The following are two lines that Sasse was unable to come to grips with, either with the help of the informants or without.

- (11) *Ndë Kundurë ra një vgje,*
Ndë Ljepsinë mbajti hje.

In Kundura a pine tree fell,
In Eleusis (it???) held shade. (???)

Some said that the pine tree was so big that its shadow extended to Eleusis, which is quite a number of kilometres away from where Kundura once was. *Hje* 'shadow' was considered to be the object. This does not explain the word *mba* 'hold': 'to hold shade or shadow' is not a common idiom. *Hje* could be the subject, however, as the verb *mba* actually has a meaning 'take', in the sense of 'occupy a certain span', attested for time concepts only, in the sense of 'last a certain time', but which could have had a locative reading as well. In this case one wonders why it doesn't appear in the definite form, which would be appropriate here in the possessive reading (its shadow, i.e. the pine's one). Because the definite form *vgjea* wouldn't rhyme? A different proposal suggests itself. In traditional Arvanitika, it was common to use the proclitic dative pronoun *i* in front of the verb to indicate possession. What if the verse really was as follows?

- (12) *Ndë Ljepsin i mbajti hje*
As far as Eleusis its shadow took (= reached, extended)

This would neatly explain the grammatical forms, and the verse would make sense.

The four examples given above illustrate different types of problems of interpretation. In (7) the metaphorical use of herbs and spices to symbolize a girl's beauty in traditional love poetry constitutes an essential background of information; understanding the stanza's meaning depends on detailed knowledge of partially obsolete conditions (culinary as well as gardening practice). In (8) the difficulty consists in the identification of obsolete toponyms as well as in knowledge about the social or economic significance of the respective places in earlier historical stages of the community and about stereotypes associated with these places. Problems of interpretation in (9) are caused by the difficulties in identifying obsolete names for groups of people, in figuring out the social stereotypes associated with such groups, in obtaining knowledge about what their clothing, accessories, decorations, etc. looked like and what vocabulary was used for these items at the time the text was composed, and finally in obtaining knowledge about stereotypes associated with these items. The problems in (10) arise from the fact that the text doesn't make sense linguistically: there is an interpretation given by the informants, probably based on oral traditions, but it doesn't match the linguistic structure of the verse. This arouses the suspicion of possible text corruption.

Variegated as these problems are, they all have in common that they necessitate either the direct archiving of a variety of multiply-layered background information, or the creation of metadata links to material archived elsewhere, often in obscure places. In fact, it could ultimately turn out to be necessary to establish links to the entire range of native speakers' knowledge associated with a given expression, something we would now call a 'cognitive frame', or 'scenario' or 'idealized cognitive model' (to use George Lakoff's term), which would include the possibility of looking at the same expression from different angles and thus arriving at different interpretations of it. Such problems are not confined to ritual texts and poetry. They may crop up everywhere, especially in dialogues that refer to everyday situations and current events that may fall into oblivion shortly afterwards.³⁷

5 Adapting the hermeneutic tradition to the documentation of meaning

There is a long-standing tradition of techniques, yet to be widely used in documenting little-known languages, that can be used as a model for an adequate representation of the kind of multi-layered

³⁷As an exercise, the reader may try to find out how much background knowledge is necessary to interpret this comparatively simple verse, which appeared, attributed only to 'Guerilla Poets', in a lift in the Department of Linguistics & Applied Linguistics, University of Melbourne, in September 2003:

*A five-cent echidna
Waddles across the bar,
Climbs into the 'tips' bowl
And buries its head in silver.*

background information necessary for the documentation of meaning. These techniques can be adapted from the 'hermeneutic'³⁸ or 'exegetic' methods of linked commentaries on sacred texts in, among others, the Talmudic, Islamic, Confucian and Buddhist traditions, all of which came up with print-based means of representing intertextuality as hypertext, which we will take to mean, simply, 'non-sequential writing', following Ted Nelson's early (1960s) formulation within Project Xanadu.³⁹ Computational implementations of hypertext, through HTML or XML on the web and elsewhere, are merely modern implementations of hypertext that take over much older traditions of hypertext implementation in printed documents, and it is useful to briefly consider a couple of examples, since though the technological resources were limited, they have a long and interesting history of confronting interpretive challenges rather similar to those we have been discussing in this paper.

At the time when the sacred texts were written, the languages of the texts, which later on turned into the so-called sacred languages (such

³⁸The term 'hermeneutics' was actually introduced by philosophers to designate a technique of interpretation that involves a continuous intuitive dialog between a given set of facts (like a text) and its interpretation. In this reading, hermeneutics is associated with the names of philosophers such as Friedrich Schleiermacher and Wilhelm Dilthey. It is not this broad sense of the term (as common in contemporary philosophy of science) that we are talking about here, but the traditional meaning of hermeneutics as it occurs in the science of religious exegesis, pertaining to the 'correct' interpretation of sacred scriptures, as in the Jewish, Islamic, and Christian traditions.

³⁹See the Project Xanadu homepage at <http://xanadu.com/>, though Yankelovich et al (1985) argue that the actual concept of hypertext goes back to Vannevar Bush in an article in the 1945 Atlantic Monthly. For further discussion of the interplay between concept and its modern implementations see also Nyce and Kahn (1989) and Tuman (1992).

as Old Hebrew, Aramaic, Classical Arabic, etc.), were the spoken languages of the writers of these texts. The writers were familiar with the lexical meanings, the cultural background, and the oral interpretive traditions linked with the content of the text. There is no indication that an exegetic science was developing at that stage. Soon after this traditional knowledge began to wane, however, principles of hermeneutic exegesis were established. This was usually done in historical steps, involving commentaries on commentaries on commentaries, etc. eventually resulting in an enormous network of linked commentaries. This is not the place to go into the many hermeneutic / exegetic principles that have been developed over the centuries. Suffice it to say here that subjects of discussion in the commentaries include theological as well as philological problems, pertaining to the literal senses of words and constructions and metaphorical senses, synchronic and diachronic grammatical questions, contextual information, the examination of parallel passages, the historical setting of the book commented on and its author. Reference is also made to earlier interpretations. Finally, there is some discussion of contradictions and the possibility of corrections of corrupted text, as far as such are permitted by theological principles.

Within the Chinese tradition, it was common to produce editions of philosophy (e.g. Mencius) or poetry (e.g. Du Fu) in which the original text, printed one character wide per column, alternated with 'interlinear commentary', printed two characters wide per column; given the lack of punctuation in the original texts this often served the further function of delimiting section endings. While these two text sequences alternated within the main columnar layout of the

book, a third layering of text was often added, as upper marginal annotations, typically in another ink colour, incorporating a further layer of commentary by scholars, especially those who had personally owned a version of the book. There was often some division of labour between these two types of commentary, with one giving notes on word meaning or specific linguistic interpretation, and another making more general comments on the literary strategies employed, and sometimes more idiosyncratic editorial or reader's comments. (This is particularly true in the case of commentaries on e.g. Ming novels, though the division of labour may be less marked for more 'authoritative' texts in the Chinese canon). Wood-block printing of short texts appears from the eighth century, and the printing of entire books became widespread from the time of the Song dynasty, but the high value placed on hand-copied manuscripts enriched by the comments of scholar-copyists entailed a blurring of the boundaries between what we might call official intertextuality and private marginalia. For some fine examples of the genre see Edgren (1984).

The Talmud is another good example of this genre. Talmud is the most significant collection of the Jewish oral tradition interpreting the Torah (the Jewish Bible comprising, in the narrow sense, the five books of Moses, in the broader sense, the entire "Old Testament"). The core of the Talmud consists of two parts, the Mishnah, and the so-called "Babylonian Talmud", the Gemara. The Mishnah part is chronologically prior to the Gemara; the Gemara is a commentary on the Mishnah, whose order it follows.

The Mishnah was compiled by Rabbi Judah “the Prince” in the early 3rd century C.E. as a redaction of earlier oral material, but it was not written down even then and probably continued to be disseminated by memory well into the Middle Ages. The Babylonian Talmud or Gemara was composed between the early 3rd and the 6th centuries. As a commentary on the commentary, it deals with all kinds of aspects of the Mishnah, often going far beyond mere explanation, exploring logical principles of interpretation, resolving contradictions, drawing on anecdotes about the rabbis, establishing links to folklore, in particular magical and medical recipes, and so on.

The earliest printings of parts of the Talmud date from the 15th century and were produced in Italy. The present page format of the Talmud was invented by Daniel Bomberg, a Christian Viennese book-printer, in the 16th century (1520-30), who conceived of the brilliant idea of liberating the typography of the page from its linear form. In the page layout devised by Bomberg, the oldest texts occupy the center as succeeding margins unfold commentaries from subsequent centuries.⁴⁰

The core of the page is occupied by alternating Mishnah and Gemara texts. Each time a Mishnah paragraph ends, the Gemara commentary follows immediately, introduced by the Hebrew letters “GM”, which stand for Gemara. This Mishna / Gemara core is surrounded by two later commentaries, those by Rashi and Tosafot. Moreover, two types of script are used to distinguish the outer circle from the inner one:

⁴⁰An excellent brief introduction to the page layout of the Talmud can be found on a webpage by Eliezer Segal, a professor of Jewish Studies at the University of Calgary – see <http://www.ucalgary.ca/~elsegal/TalmudPage.html>.

The Mishna / Gemara core is printed in so-called square letters, while the Rashi and Tosafot circle is printed in a semi-cursive typeface called the "Rashi script".

Rashi (which is an acronym for its author Rabbi Solomon ben Isaac) was written in the early 10th century, while Tosafot (which means "supplements") was added later and is intended to supplement Rashi's basic commentary. Tosafot was composed by many authors throughout the 12th and 13th centuries.

Note that Rashi's commentary is always printed on the inner margin of the page, while the Tosafot are printed on its outer margin; i.e. when looking at an opened book you will see the Tosafot in the columns closest to the edges of the pages, farthest from the binding.

Other commentaries from the Middle Ages first appear in the Vilna Talmud and are placed in a second circle around Rashi and Tosafot.

More recent printings of the Talmud have incorporated additional short comments ("marginal glosses") by various rabbis who lived during the last few centuries. Most of these are emendations to the text, while others contain cross-references. The Ein Mishpat ("Wellspring of Justice") and Ner Mitzvah ("Lamp of Commandment") date from the 16th century and contain references to the main codes of Jewish law.

Interestingly enough, additions to the Talmud do not stop there. Even though the Talmud is considered a sacred text, publishers and editors of newer editions do not hesitate to include their own commentaries,

if only in the form of photographs, pictures and clarifying comments (maps, datelines, etc.) or simple footnote marks.

As mentioned above, the Talmud, as an early example of deviation from linear text structure, is clearly a type of hypertext, implemented within the technological constraints of printed book format. In fact there is an interesting homepage by Contra (2003) entitled "Talmud as Hypertext" which develops the case that the Talmud forms a very good analogue to the Internet. We will just quote a few lines from this website: "The little notations on the sides are hot buttons. The different commentaries are very like frames, a common HTML implementation in which different sections of text can be read as accompaniments to each other, but can be, indeed must be, read at different times and speeds in separate spaces on the electronic page... But beyond their physical similarities, both hypertext and the Talmud⁴¹ imply a way of knowing that is very different from the linear book. It attempts to capture the noise of a symposium, a hot and multivoiced discussion..."

The analogy to modern implementations of hypertext, though, is not perfect. What is related, in the first place, is the non-linear structure of the text in the form of a hierarchy or encapsulation of multilayered meta-information (meta-information on meta-information etc.). This leads to a more adequate representation of the fact that there isn't a single or unique interpretation of a given text but there are rather a lot of different interpretive aspects of it. Otherwise the Talmud is clearly different from modern web-based implementations in that it

⁴¹This is Contra's wording, not ours: if the Talmud is regarded as hypertext implemented in print, the phrasing 'both hypertext and the Talmud' is misleading.

still is a book; it does not allow the kind of linking that is possible electronically, and that has been exploited so successfully in such recent implementations of scholarly hypertext as the densely hypertextual library of interpretation of classical Greek texts developed by Gregory Crane's Perseus Project (Crane 1998; see also <http://www.perseus.tufts.edu/>), which links original texts to a whole range of background and interpretive materials (ranging from parsings of irregular verbs to multi-angle photographs of Greek vases), or Bernard Muir's Ductus, a web-based, interactive multimedia program designed to facilitate the teaching of paleography, in particular the study of the history of western European handwriting (<http://www.medieval.unimelb.edu.au/ductus/>).

Can these models be successfully adapted to the documentation of meaning? One might object that the Talmud, for example, is a highly sophisticated commentary, incorporating a wealth of exegetic research over several centuries, scientific as well as philosophical. We are not usually confronted with a degree of complexity like this when doing actual fieldwork. Nevertheless, we have seen that mythological texts, folk poetry, and even everyday conversations clearly require interpretive steps whose similarity to 'hermeneutic' and 'exegetic' types of information is obvious, and the linked commentary tradition provides an excellent technique for archiving these types of information in subsequent steps in the form of multilayered information, whose interpretive power can be enhanced now by modern technology. Informants' discussions and subsequent commentaries by others, and information retrieved from maps and encyclopaedias and even official statistics (such as in the Arvanitika case) strikingly resemble material present in multilayered

commentary structures such as that of the Talmud, and are good candidates to be archived along with the translation of the original recordings. Material so represented may also include speakers volunteering example sentences or other material illustrating how to use words that crop up in texts.

To make sense of what we hear and see, whether as outsiders or insiders, we have to endow our sharp new recordings of sounds and sights with the full texture of meaning that will always lie intangibly beyond immediate capture. Developing appropriate archiving technologies that assist researchers, today, tomorrow and on into the future, to construct appropriate multi-layered annotations, made over many field-sessions and often by multiple investigators, bringing in information from a number of members of the speech community, is a major part of the challenge that linguists, musicologists and ethnographers, IT engineers, and archivists must meet together.⁴²

References

Alpher, Barry J. 1982. Dalabon dual-subject prefixes, kinship categories and generation skewing. In J. Heath, F. Merlan and A. Rumsey, eds, *Languages of Kinship in Aboriginal Australia*, 19-30. Sydney: Oceania Linguistic Monographs #24.

Becker, Alton L. 1995. *Beyond Translation. Essays towards a Modern Philology*. Ann Arbor: The University of Michigan Press.

⁴²As an anonymous referee for this paper pointed out, 'archiving multimedia and text is a massive problem and there is no current technology that allows us to do this. Thus XML DTDs exist for text types but none such for 'multi-layered annotations' that the authors refer to.' Clearly these technological problems will take some time to solve.

- Berndt, Ronald M. & Catherine H. 1988. *The Speaking Land*. Ringwood: Penguin.
- Bird, Steven. 2001. A formal framework for linguistic annotation. *Speech Communication* 33(1,2):23-60.
<http://www ldc.upenn.edu/sb/home/publications.html#0010033>
- Borges, Jorge. 1985. *Prosa Completa 2. Historia de la eternidad, Ficciones, El Aleph*. Barcelona: Bruguera.
- Bow, Catherine, Baden Hughes and Steven Bird. (In prep.) A Four-level model for Interlinear Text. <http://www ldc.upenn.edu/sb/home/papers/llc.pdf>
- Bowerman, Melissa & Stephen C. Levinson (eds.) 2001. *Language Acquisition and Conceptual Development*. Cambridge: Cambridge Univ. Press
- Capell, Arthur. 1962. Dalabon Grammar. *Some Linguistic Types in Australia*. Sydney: Oceania Linguistic Monographs #7, pp. 91-126.
- Contra. 2003. *Talmud as Hypertext*.
<http://english.ttu.edu/kairos/3.1/coverweb/porush/contra4.html>
- Crane, Gregory. 1998. The Perseus Project and beyond. D-Lib Magazine, January 1998. <http://www.dlib.org/dlib/january98/01crane.html>
- Edgren, Sören. 1984. *Chinese rare books in American collections*. New York City: China House Gallery.
- Evans, Nicholas. 1995. *A grammar of Kayardild*. Berlin: Mouton de Gruyter.
- Evans, Nicholas. 1997. Sign metonymies and the problem of flora-fauna polysemy in Australian linguistics. In Darrell Tryon & Michael Walsh, eds., *Boundary Rider. Essays in Honour of Geoffrey O'Grady*. Canberra: Pacific Linguistics. C-136.
- Evans, Nicholas. 2001. The last speaker is dead – long live the last speaker! In Paul Newman & Martha Ratliff, eds. *Linguistic Field Work*. Cambridge: Cambridge University Press. Pp. 250-281.
- Evans, Nicholas, Dunstan Brown & Greville Corbett. 2001. Dalabon pronominal prefixes and the typology of syncretism: a Network Morphology analysis. *Yearbook of Morphology 2000*, 187-231.

Evans, Nicholas, Francesca Merlan and Maggie Tukumba. 2004. *A first dictionary of Dalabon (Ngalkbon)*. Maningrida: Bawinanga Aboriginal Corporation.

Evans, Nicholas & Francesca Merlan. 2003. Dalabon verb conjugations. In Nicholas Evans (ed.), *The non-Pama-Nyungan languages of northern Australia: comparative studies of the continent's most linguistically complex region*. Canberra: Pacific Linguistics. Pp. 269-283

Garde, Murray. 2003. *Social Deixis in Bininj Gun-wok conversation*. Unpublished Ph.D. Thesis, University of Queensland.

Gopnik, A. & S. Choi. 1995. Names, relational words, and cognitive development in English and Korean speakers: nouns are not always learned before verbs. In M. Tomasello & W. Merriman (eds.), *Beyond names for things: young children's acquisition of verbs*. Hillsdale, NJ: Lawrence Erlbaum.

Hellwig, Birgit. 2006. Field semantics and grammar-writing: stimuli-based techniques and the study of locative verbs. In Felix Ameka, Alan Dench and Nicholas Evans (eds.) *Catching Language: the Standing Challenge of Grammar Writing*. Berlin: Mouton de Gruyter.

Hirsch, Eli. 1993. *Dividing reality*. New York & Oxford: Oxford University Press.

Lewis, David. 1984. Putnam's paradox. *Australasian Journal of Philosophy*. 62.3:221-36.

Mel'cuk, Igor. 1968 [1976]. Stroenie jazykovyx znakov I vozmozhnye formal'no-smyslovyje otnoshenija mezhdur nimi. *Izvestija AN SSR, Serija lit. I jaz.*, 1968, vyp. 5. English translation available: The structure of linguistic signs and possible formal-semantic relations between them. *Das Wort*. WilhelmFink Verlag: München. Pp. 89-114.

Mel'cuk, Igor, Nadia Arbatchewksy-Jumarie, Lidija Iordanskaja & Suzanne Mantha. 1992. *Dictionnaire explicatif et combinatoire du français contemporain*. Montréal: Les Presses de l'Université de Montréal.

Merlan, Francesca. 1989. Jawoyn relationship terms: interactional dimensions of Australian kin classification. *Anthropological Linguistics* 31.3/4:227-263.

- Nyce, J.M. and P. Kahn. 1989. Innovation, pragmatism and technological continuity: Vannevar Bush's Memex. *Journal of the American Society for Information Science* 40:214-20.
- Peirce, Charles Sanders. 1932. Speculative grammar. In *Collected Papers of Charles Sanders Peirce, Vol. II: Elements of Logic*, ed. C. Hartshorne and P. Weiss. Cambridge, Mass.: Harvard University Press.
- Plato. 1966. *Phaedrus*. (With commentary and translation by C.J. Rowe). Warminster: Aris & Phillips.
- Pollard, C. & I.A. Sag. 1987. *Information-based syntax and semantics*. Stanford: CSLI.
- Quine, Willard V. 1960. *Word and Object*. Cambridge, Mass.: MIT Press.
- Sandefur, John & Joy Sandefur. 1982. *An introduction to conversational Kriol*. Darwin: SIL-AAIB.
- Sasse, Hans-Jürgen. 1991. *Arvanitika. Die albanischen Sprachreste in Griechenland*. Wiesbaden: Harrassowitz.
- Saussure, F. de 1979 [1915]. *Cours de linguistique générale*. Éd. critique prép. Tullio de Mauro. Paris: Payot.
- Segal, Eliezer. 2003. *A Page from the Babylonian Talmud*. <http://www.ucalgary.ca/~elsegal/TalmudPage.html>.
- Sutton, Peter and Michael Walsh. 1987. *Wordlist for Australian languages (Second Edition)*. Canberra: Australian Institute of Aboriginal Studies.
- Talmy, Len. 1985. Lexicalization Patterns: Semantic Structure in Lexical Forms. In Tim Shopen (ed.) *Language Typology and Syntactic Description, Vol. III: Grammatical Categories in the Lexicon*. Cambridge: Cambridge University Press.
- Tuman, Myron. (ed.) 1992. *Literacy Online*. Pittsburgh: University of Pittsburgh.
- Wittgenstein, Ludwig. 1953. *Philosophical Investigations* (trans. G.E.M. Anscombe). Oxford: Basil Blackwell.
- Worms, Ernest. 1942. Sense of smell of the Australian Aborigines. A psychological and linguistic study of the natives of the Kimberley division. *Oceania* 13.2:107-130.

Yankelovich, N., Mayrowitz, N.K. and A. van Dam. 1985. Reading and writing the electronic book. *IEEE Computer* 18:15-30.

Appendix. Full text of the Korlomomo and Berrerberrerd story

Recorded at Mobarn (Bluewaters Outstation), on 17/7/03 from Maggie Tukumba (Ngarridjdan) by NE, in presence of George Jinawangka Left Hand (Balang)

Tape Reference: Dal 2003.7

Initial transcription: Dal 2003 Notebook 1, pp. 88-94 (seven pages only)

1. Dalabon text.

Nunh, nunh ru:l kahnunh, dubmi korlomomo ngurra-marnu-wey, ngurraye-marnû-wey, kanunh rul-no, kaye-yungi korlomomo.

Nunh manjh ngong, njerrh-no ngurrah-nguy, djenj, munguhdjam, nunh mak, nunh mak ngurra-kinji, kurlbano-dorrunguh ngurrah-nguy njerrh-no ngurrah-dja-nguy, bah, waluno gorr kah-marnû-yunj, kanunh .. berrerberrerd-yih, kanh lad bukah-yemey, dubmi mah ngarrah-dja-yongi, wah-kah, nunda kayin ngarra-dulhmun nunh mak ngarra-dulhmini nunh ngarrah-njimini, wah-kah ngarrah-yongi yirrhwalûng, karreh-barrhbuyi, munu ngarrah-....ngarrah-... ngarrah-boni berrh-kah manjh, kung werrh ngurrah-yawey ngurrah-nguy mey berrh-kah ngarrah-yawoyh-dudjmi ngarrah-daddangi yirrhwalûng wah-kah, kanihdja wadda ngurrah-buy ngarrah-yongi

Bah rul kanh bûkah-marnû-yunj kanh berrerberrerd-yih bûkah-yemey, kanh berrerberrerd-yi rul gorr kah-marnû-yunj, lad, lad bûkah-yemey, lad kanh kayidjnaninj kanh korlomomo-yih gorr kah-balan-darahminj bah berrerberrerd kah-dja-bo:ng, bûkah-djam.. bûkah-dja-men-werreminj bûkah-dja-marnû-kedjakmi:nj dord bûkah-marnû-naninj, bûkah-dolku-boyoboyohminj ka-njengu-yo dord bûkah-marnû-naninj, kenbo kah-djalng... kah-nang kah-wulubminj kahng-njengu-donj kanunh lad ... yerrerd! bûkah-warnu-mey berrerberrerd berrerberrerdberre:::rd bûkah-marnû-yininj, bûkah-marnû-ye-dolkang nahda bilinjdjibilinjdji karrah

Kahlng-mayahminj ka-warrabbaminj kah-kabarrHminj kah-kabarrHminj
kahkeno korrehkun bûkahlng-marnû-ye-komhminj kah-yininj, yelûng bonj kanunh rul
kanh ngurrahlng-marnu-wan kanh berrerdberred, manjh nunh kanh kanj-no ngurrah-
kinj kunj, kerninjh-no nunh kanh kardu bernuk nunh bulikki nunh kanj-no kurlba
nunh kanh kahlng-dombun kanh mimal-yih mimal-yih kanh ngurrah-kinj nunh kanh
kurlba-burnda-kah kanunh ngurrahlng-ngun djorlûng-no, kanh ngurrah-ngun bonj [G:
djourlungno] dubmi njerrh-no ngurrah-ngunguy. Bonj.

2. English translation

That custom (of cooking meat with fire), we would have been following the crocodile's way now, it's that way which we would be following, which the crocodile laid down.

Like any sort of meat, we would have eaten it raw, or fish, or whatever, we wouldn't have cooked it, but would have eaten it dripping with blood. We would still just be eating (meat) raw, but Rainbow Bee Eater made that (new) way for us, he snatched away the firestick from him (Crocodile). And we would still be living in the water, cold like we are now (in this season). But we wouldn't be cold and we'd go in and live under the water, and when the new day would break, we would just go out of the water to look for animals, or honey, or ??, we would eat food in a dry place, out of the water. and (then) go back under the water. We would have stayed there under the water all the time.

But Berrerdberred the Rainbow Bee Eater put that custom of his there (of the crocodile's, i.e. of cooking food), when he snatched it from him. That Rainbow Bee Eater established that custom for us. He snatched the firestick from him, the firestick that the crocodile was holding onto. He (crocodile) nearly managed to keep it from us. But rainbow bird just dived (went) down. And he.. he just won him over, he just kept coming to him over and over. He groomed him for lice, he rubbed his back. He groomed him for lice while he was asleep, then he ... he saw that now he was fast asleep under the water ... He snatched the firestick off him, and called out Berrerdberredberredberred to him, as he flew way up into the sky taking it up away from him.

Then (crocodile) couldn't work out what had happened, he staggered around groping about with his hands (for the firestick)... But to no avail, (Rainbow Bee Eater) had already taken it away from him. He made it so we would follow (Crocodile's) custom (by cooking on fires), Rainbow Bee Eater did. We cook the meat of animals,

kangaroos, ofwhatchacallem, maybe of bush turkeys, or of bullocks, the fire dries the blood out of their meat. We use fire to cook the meat and dry the blood out. And we eat it like that, cooked, that's how we eat it, right. (Otherwise) we would keep eating (food) raw even today. That's all.

3. Version with interlinear gloss (including footnotes representing some interpretive comments)

(1)

<i>Nunh</i>	<i>ru:l</i>	<i>kahnunh,</i>	<i>dubmi</i>	<i>korlomomo</i>	<i>ngurra-marnu-wey,</i>
DEM	rule	that	now	crocodile	12pl/3-BEN-followIRR

'That custom (of cooking meat with fire), we would have been following the crocodile's way now,

(2)

<i>ngurra-ye-marnû-wey,</i>	<i>kanunh</i>	<i>rul-no,</i>
12pl/3-SUB-BEN-followIRR	that	rule-3POSSD

'it's that way which we would be following,

(3)

<i>kaye-yungi</i>	<i>korlomomo,</i>
3SUB-put.downIRR	crocodile

'which the crocodile laid down.

(4)

<i>nunh</i>	<i>manjh</i>	<i>ngong,</i>	<i>njerrh-no</i>	<i>ngurra-h-ngu-y,</i>	<i>djenj,</i>	<i>munguhdjam,</i>
DEM	meat	all	raw-ADJ	12pl/3-As-eat-IRR ⁴³	fish	whatever

'like any sort of meat, we would have eaten it raw, or fish, or whatever,

(5)

<i>nunh</i>	<i>mak,</i>	<i>nunh</i>	<i>mak</i>	<i>ngurra-kinji,</i>	<i>kurlba-no-dorrung</i>	<i>ngurra-h-ngu-y</i>
DEM	NEG	DEM	NEG	12pl/3-cookIRR	blood-3POSSD-with	12pl/3-AS-eat-IRR

'we wouldn't have cooked it, but would have eaten it dripping with blood.

⁴³Throughout the text the combination of the realis prefix (i.e. with the final glottal stop, h) with the irrealis suffix is used for hypothetical positive statements (translated with *andi* in Kriol), whereas hypothetical negative statements use the irrealis prefix (i.e. without the final glottal stop).

(6)

njerrh-no ngurrah-dja-nguy, bah, walu-no ngorr kah-marnû-yunj,
raw-ADJ⁴⁴ 12pl-AS-just-eat-IRR but custom-PART 3/12As-BEN-putPP

kanunh berrerberrerd-yih, kanh lad bukah-yeme-y
DEM rainbow.bee.eater-INST DEM firestick 3/3hiAs-snatch.away-PP

'We would still just be eating (meat) raw, but Rainbow Bee Eater made that (new) way for us, he snatched away the firestick from him (Crocodile).

(7)

dubmi mah ngarrah-dja-yongi wah-kah
now also 12plAs-just-lieIRR water-LOC

'And we would still be living in the water.

(8)

nunda kah-yin ngarra-dulhmun
this 3As-doPR 12pl-be.coldPR

'Like now (in this season) we're cold,⁴⁵

(9)

nunh mak ngarra-dulhmini nunh ngarrah-njimini,
DEM not 12pl-be.coldIRR DEM 12pl-go.inIRR

'But we wouldn't be cold and we'd go in

(10)

wah-kah ngarrah-yongi yirrhwalûng, ka-rreh-barrhbuyi,
water-LOC 12plAs-liveIRR under 3-morning-day.breakIRR

⁴⁴We wouldn't have cooked animals, we would have eaten them raw, covered with (their) blood. N.b. this is a bridging context for the development of *njerrhno* from a noun 'its body' to an adjective 'raw' - here the two translations 'would have eaten their bodies (still) covered with blood' or 'would have eaten them raw (still) covered with blood' are both possible

⁴⁵Context: it was July, the cold season, as we were discussing this, and over the last few days MT and GJ had frequently commented on how cold it was, how they didn't have enough warm clothes, etc.

`and live under the water, and when the new day would break,

(11)

munu ngarrah-.... ngarrah-boni berrh-kah
just 12plAss 12plAs-goIRR outside-LOC

`we would just go out of the water..

(12)

manjh, kung werrh ngurrah-yawey
animals honey ? 12pl/3As-seeIRR

`to look for animals, or honey, or ??,

(13)

ngurrah-nguy mey berrh-kah
12pl/3As-eatIRR veg.food outside-LOC

`we would eat food in a dry place, out of the water.

(14)

ngarrah-yawoyh-dudjmi ngarrah-daddangi
12plAs-again-returnIRR 12plAs-be.insideIRR

`and (then) gone back under the water.

(15)

yirrhwalûng wah-kah, kanihdja wadda ngurrah-buy ngarrah-yongi
under water-LOC DEM camp 12pl/3As-hitIR 12plAs-liveIRR

`We would have stayed there under the water all the time.

(16)

bah rul kanh bûkah-marnû- yunj
but custom DEM 3/3hiAs-BEN-putPP

`But he put that custom of his there (of the crocodile's, i.e. of cooking food)

(17)

kanh berrerdbererd-yih bûkah-yemey,
DEM rainbow.bee.eater-INSTR 3/3hiAs-snatchPP

`when Rainbow Bee Eater snatched it from him,

(18)

kanh berrerdbererd-yi rul ngorr kah-marnû-yunj,
DEM rainbow.bee.eater-INSTR custom 3/12plAs-BEN-putPP

`That Rainbow Bee Eater established that custom for us,

(19)

lad bûkah-yemey, lad kanh ka-yidjnjaninj kanh korlomomo-yih
firestick 3/3hiAs-snatchPP firestick DEM 3/3-holdPI DEM crocodile-INSTR

'He snatched the firestick from him, the firestick that the crocodile was holding onto,

(20)

ngorr kah-balan-darahminj

3/12As-almost-withhold.fromPP

'He (crocodile) nearly managed to keep it from us,

(21)

bah berrerd berrerd kah-dja-bo:ng,

but rainbow.bird 3As-just-goPP

'But rainbow bird just dived (went) down.

(22)

bûkah-djam.. bûkah-dja-men-werreminj bûkah-dja-marnû-kedjakmi:nj

3/3hiAs-HES 3/3hiAs-just-mind-sweetenPP 3/3hiAs-just-BEN-return.overPP

'And he.. he just won him over, he just kept coming to him over and over,

(23)

dord bûkah-marnû-naninj, bûkah-dolku-boyoboyohminj

louse 3/3hiAs-BEN-lookPI 3/3hiAs-back-ITER-rubPP

'He groomed him for lice, he rubbed his back,

(24)

ka-njengu-yo dord bûkah-marnû-naninj, kenbo kah-dja-Ing...

3-asleep-liePP louse 3/3hiAs-BEN-lookPI then 3As-just-SEQ

'He groomed him for lice while he was asleep, then he ..

(25)

kah-nang kah-wulubminj ka-h-Ing-njengu-donj

3/3As-seePP 3As-be.in.waterPP 3-As-SEQ-asleep-diePP

'He saw that now he was fast asleep under the water ...

(26)

kanunh lad ... yerrerd! bûkah-warnu-mey

that firestick snatch 3/3hAs-arm-getPP

'He snatched the firestick off him.

(27)

berrerd berrerd berrerd berrerd berrerd bûka-h-marnû-yininj ,

[onom.] 3/3h-As-BEN-sayPP

(28)

bûkah-marnû-ye-dolkang nahda bilinjdjibbilinjdji karrh
 3/3hAs-BEN-COM-go.upPP this.way long.way up

'and called out Berrerdberredberredberred to him, as he flew way up into the sky taking it up away from him.

(29)

kah-Ing-mayahminj ka-warrabbaminj kah-kabarrHminj
 3As-Seq-be.confusedPP 3-stagger.roundPP 3As-grope.aroundPP

'Then (crocodile) couldn't work out what had happened, he staggered around groping about with his hands (for the firestick)..'

(30)

kahkeno korrehkun bûkahIng-marnû-ye-komhminj
 nothing before 3/3hiAs-SEQ-BEN-COM-leavePP

'But to no avail, (Rainbow Bee Eater) had already taken it away from him.

(31)

kah-yininj, yelûng bonj kanunh rul
 3As-doPP then all.right DEM custom

kanh ngurrahIng-marnu-wan, kanh berrerdberred,
 DEM 12pl/3As-Seq-BEN-followPR DEM Rainbow.Bee.Eater

'He made it so we would follow (Crocodile's) custom (by cooking on fires), Rainbow Bee Eater did,

(32)

manjh nunh kanh kanj-no ngurrah-kinj kunj,
 animal DEM DEM meat-3POSSD 12pl/3As-cookPR kangaroo

'We cook the meat of animals, kangaroos,

(33)

kerninjh-no nunh kanh kardu bernuk nunh bulikki nunh
 whatsit-3POSSD DEM DEM maybe bush.turkey DEM bullock DEM

'Of whatchacallem, maybe of bush turkeys, or of bullocks,

(34)

kanj-no kurlba nunh kanh ka-h-Ing-dombun kanh mimal-yih
 meat-3POSSD blood DEM DEM 3/3-As-Seq-make.dryPR DEM fire-INSTR

'The fire dries the blood out of their meat.

(35)

mimal-yih kanh ngurrah-kinj nunh kanh kurlba-burnda-kah
 fire-INSTR DEM 12pl/3As-cookPR DEM DEM blood-dried.up-LOC

'We use fire to cook the meat and dry the blood out.

(36)

kanunh ngurrahng-ngun djorlûng-no, kanh ngurrah-ngun bonj
DEM 12pl/3As-Seq-eat-PR cooked-Adj DEM 12plAs-eat-PR OK

'And we eat it like that, cooked, that's how we eat it, right.'

(37)

dubmi njerrh-no ngurrah-ngunguy. Bonj.
now raw-adj 12pl/3As-ITER-eat-IRR finished

'(Otherwise) we would keep eating (food) raw even today. That's all.'