

NATIONAL SCIENCE FOUNDATION



NATIONAL ENDOWMENT FOR THE HUMANITIES



Documenting Endangered Languages

SAMPLE APPLICATION NARRATIVE

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<http://www.nsf.gov/pubs/2006/nsf06577/nsf06577.htm>

Archiving Significant Collections of Endangered Language Resources

The Archive of the Indigenous Languages of Latin America (AILLA) is a digital repository of multimedia materials. A central part of AILLA's mission is to rescue perishable analog materials, digitize them in accordance with international standards, house them in a secure repository, and make them accessible to indigenous people, researchers, and interested laypersons worldwide. The three-year Archiving Significant Collections (ASC) project will perform this service for eight important research collections, listed below.

1. Ellen Basso, Kalapalo (KUI), Cariban, Brazil;
2. Jonathan Hill, Curripaco (KPC), Arawakan, Venezuela;
3. John McDowell, Inga (INB), Quechuan and Kamsá (KBH), isolate, Colombia;
4. Janet Chernela, Waunano (SAI), Tucanoan, Brazil;
5. Jane and Kenneth Hill, Nahuatl (NHN, others), Uto-Aztecan, Mexico;
6. Victoria Bricker, Yucateco (YUA) and Tzotzil (TZZ), Mayan, Mexico;
7. Marie Claude Mattéi-Muller, Panare (PBH), Cariban; & others; Venezuela;
8. Adolfo Costenla Umaña, Bribri (BZD), and others, all Chibchan, Costa Rica.

1.1. Intellectual merit of the project

These eight collections are the results of decades of research by pre-eminent scholars that will constitute a significant resource for linguistic and other kinds of research. Five of the collections document languages of Amazonia, a region especially noted for complex linguistic and cultural interconnections. Made accessible in one location in standard formats, these collections will no doubt stimulate studies that shed light on this as yet poorly understood linguistic area.

All of these researchers have a strong interest in discourse styles and verbal art and have thus always been careful to make high-quality recordings. Most of them have published books about oral works of particular significance (e.g. Basso, 1995; Jonathan Hill, 1993; McDowell, 1994) that offer detailed analyses and transcriptions, but no transcription can hope to display the full complexity of a great work of oral literature. Scholars who work with discourse always note that it is impossible to do more than scratch the surface of what they want to say about the objects of their study. Archiving the primary recordings enables the full richness of these works to be appreciated and exploited in future studies.

1.2. Broader impacts of the project

Preparing a large corpus for archiving is a daunting task for a researcher with a career's worth of materials to consider. Often the work is postponed; sometimes, until it is too late for the researcher to participate in the process personally. The ASC project will maintain a complete worklog for each collection which will be posted, along with a summary of the results, on AILLA's website. This information will make the task of preparing a corpus for archiving easier to budget in terms of time and staffing, which will greatly aid in encouraging scholars to undertake the task.

There are hundreds (at least) of irreplaceable recordings of endangered languages languishing in unusable formats in inaccessible locations. There is also a resurgence of energy and skill, initiated largely by indigenous communities, directed at the revitalization of their languages. Old recordings and notes would be a great boon to these efforts, if they could be delivered in some readily accessible form, especially high-quality recordings of disappearing forms of discourse. Archives such as AILLA are the medium through which this connection can be made and these valuable materials made available for further research and for indigenous language education programs.

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D. Project description

1.0 Introduction

The Archive of the Indigenous Languages of Latin America (AILLA) is a digital repository of multimedia materials in and about the indigenous languages of Latin America. A central part of AILLA's mission is to rescue perishable analog materials, digitize them in accordance with international standards, house them in our secure repository, and make them accessible to indigenous people, researchers, and interested laypersons worldwide. The three-year Archiving Significant Collections (ASC) of Endangered Language Resources project will perform this service for eight important research collections, listed below.

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quality recordings of disappearing forms of discourse. Archives such as AILLA are the medium through which this connection can be made and these valuable materials made available for further research and for indigenous language education programs.

2.0. Project objectives

The ASC project will result in the archiving of eight significant collections of audio recordings, texts, and photographs for thirteen endangered languages of Latin America. The project will allow archive staff to work closely with the creators of these resources in determining the sorting of the materials into resources (see section 3.1) and developing detailed catalog information. This will make them vastly more useful to a wide range of researchers and language educators over the long term. It is not possible to state precisely how many hours of recordings, pages of text, and photographs will be archived through this project, since assessing the collections is the first task to be done. General estimates provided by the AILLA Fellows, as project participants are termed, indicate something on the order of 150 - 300 hours of recordings, 1800 pages of texts, and 100 photographs.

The project will proceed over a three-year period, from September 1, 2006 to May 31, 2009. Project work will be done only during the long fall and spring semesters. Some collections will require only one semester for processing. The schedule is:

1. Fall 2006: Ellen Basso (Kalapalo) and Jonathan Hill (Curripaco);
2. Spring 2007: John McDowell (Inga, Kamsá) and Janet Chernela (Waunano);
3. Fall 2007: Jane & Kenneth Hill (Nahuatl) and Victoria Bricker (Yucateco);
4. Spring 2008: Jane & Kenneth Hill (Nahuatl) and Victoria Bricker (Tzotzil);
5. Fall 2008: Marie Claude Mattéi Muller (various) and Adolfo Costenla (various);
6. Spring 2009: Marie Claude Mattéi Muller (various) and Adolfo Costenla (various);

2.1 The collections

The following paragraphs summarize the research interests of the AILLA Fellows, some characteristics of the languages, and an estimate of the materials to be archived. Information about the language families is drawn from Campbell, 1997. Population data are taken from the SIL Ethnologue (Gordon, 2005). The date following the number of speakers is the date of the census cited. A partial bibliography for each Fellow is given in the References section.

The collections to be archived by the ASC project are particularly rich in resources from Amazonia, including materials from Venezuela (Curripaco, Panare), Brazil (Kalapalo, Wanano), and Colombia (Kamsá, Inga). Both the Vaupés region and the Sibundoy Valley region have been crossroads of indigenous languages and cultures for centuries. These are places where the Amazonian peoples meet the Andean peoples, spreading the wide-reaching influence of the Incas in pre-Colonial times. According to Aikenvald, 2003, "The area is known for its language group exogamy & institutionalized multilingualism, with language being the badge of identity for each group" (see also Jackson, 1974.) The languages of this region are poorly documented; indeed, it is difficult to write a grammar of a single language because of the massive multilingualism. The area is also known for the extraordinary richness of its discourse, which includes forms such as ceremonial dialogue, echo speech, formal greetings, ritual wailing, evidentiality, and a great emphasis in discourse on reported speech. The languages documented in the ASC collections are all severely endangered and the regions as a whole is imminently threatened by encroaching commercial developments.

At the other end of the spectrum in terms of numbers of speakers and existing documentation are the languages of Mesoamerica documented in the Jane and Kenneth Hill (Nahuatl) and Victoria Bricker (Yucatec Maya, Tzotzil) collections. Each of these

languages has hundreds of thousands of speakers and substantial scholarly documentation (e.g. Nahautl: Andrews, 1975; Sullivan, 1988; Karttunen, 1983; Yucatec Maya: Barrera, 1980; Blair, 1964; Bolles & Bolles, 2001; Tzotzil: Laughlin, 1975; Haviland, 1981; Aissen, 1987.) Courses are offered in all three of these languages at American and European universities. Yet it is precisely because the languages are so vibrant that the Hill & Hill and Bricker collections urgently need to be archived: there are increasing numbers of native speaker researchers and educators who would welcome recordings from decades past for their own investigations (Valentín Peralta, p.c.) and especially for use in language education programs (Flores Farfán 2001a and 2001b).

In between the languages of Mesoamerica and those of Amazonia are the Chibchan languages of Central America, represented in the Costenla collection. Costenla refers to this region as the "intermediate area": these languages exhibit influences from both north and south, in their lexicons and grammars as well as in discourse styles and genres (Costenla, 1991.) While the indigenous languages of Costa Rica are also severely endangered, there are active bilingual education programs in many communities that could make good use of the Costenla collection if it were made available to them in easily-accessed formats.

2.1.1 Ellen Basso

Dr. Ellen Basso is a professor in the department of Anthropology at the University of Arizona. She has been investigating the language and culture of the Kalapalo Indians of Brazil since the 1970's. Her corpus constitutes the only significant documentation of this severely endangered language. She has published seven books based, at least in part, on the recordings that she is planning to archive at AILLA. She has a long-standing interest in the study of discourse and the explanatory and didactic functions of narrative in non-literate societies.

Kalapalo is a member of the Cariban language family. There are fewer than 500 Kalapalo living in the Indigenous Park of the Xingú in the southern part of the Brazilian Amazon basin (2000). There are thirteen other indigenous groups in the park, including the Kuikuro, with whom the Kalapalo share a language (KUI.) Cariban languages in general are poorly documented (Aikhenvald, 2001), although members of the family possess features of considerable interest to linguistic theory (Payne, 1990) such as evidentials (Epps, 2003), a continuum in the ergative-accusative dimension (Gildea, 1998; Franchetto, 1990) and unusual word orders (Maia, et al., 1999.) Kalapalo is an ergative language with OV word order.

Basso has selected 20 tapes, 85 texts containing transcriptions and translations, and an unspecified number of photographs to be archived.

2.1.2 Jonathan Hill

Dr. Jonathan Hill is a professor of Anthropology at Southern Illinois University. He has been conducting research for twenty years in Arawakan languages, cultures, and ethnohistory, most particularly concerning the Curripaco peoples living in the Upper Rio Negro region of the Venezuelan Amazon. There is no published documentation of the Curripaco language and culture in English apart from Hill's work. He is interested in the study of myth, music, and ritual as processes of constructing, transforming, and reproducing power relations, both within the indigenous social order and in the history of interethnic relations with conquering non-indigenous peoples.

There are some 2,700 speakers of Curripaco in Venezuela, Brazil, and Colombia (2000.) Curripaco, also known as Wakuénai (KPC), is a member of the large Arawakan (Maipuran) language family. There is little published documentation of the languages of this extensive and important language family.

Hill has archived 29 cassette tapes with recordings in Curripaco at the Indiana Archive of Traditional Music. We will obtain copies of these recordings to digitize and archive at AILLA. Hill is planning to develop bilingual editions of narratives for use by the Curripaco in Venezuela, so as part of the ASC project, we will work with him to format his materials so that they can easily be downloaded and produced as books and tapes in Venezuela for distribution there.

2.1.3 John McDowell

Dr. John H. McDowell is a professor of Folklore at Indiana University. He has been working with the Inga and Kamsá communities of the Sibundoy Valley region in Colombia for more than 25 years. Like Basso and Jonathan Hill, he has been particularly interested in documenting the "rich fabric of verbal expressive forms as they implicate the spiritual life and cosmology of these peoples, and inform their everyday lives as well as their carnival celebrations¹."

Kamsá (KBH) is a language isolate with 4,000 speakers (1998). This language is virtually undocumented, apart from some phonological studies (Howard, 1967; Howard, 1972) and McDowell's work. The Kamsá have managed to maintain their linguistic and cultural uniqueness in spite of being nearly surrounded by speakers of Inga (INB), a Quechuan language with some 10,000 speakers (1995). Quechuan is one of the dominant language families in Latin America, with more than a million speakers (of all varieties). Inga is unusual in being a lowland variety and a participant in the maze of linguistic and cultural interconnections of the Amazonian region. It is also sparsely documented, apart from phonological studies (Parks, 1990) and comparisons with other Quechuan languages (Levinsohn, 1978, 1991.)

McDowell will archive 20 cassette tapes holding some 40 narratives, the accompanying transcriptions and translations, and numerous photographs and slides.

2.1.4 Janet Chernela

Dr. Janet Chernela is a professor of Anthropology at the University of Maryland. She has been working with the Wanano people of the Brazilian Amazon since the early 1970's on a range of topics including cultural and land rights, narratives, song, and language and gender.

Wanano (SAI) is a Tucanoan language with about 1,000 speakers (1995) on the Vaupés river in northwestern Amazonia in Brazil and Colombia. While there is a fair amount of documentation for other languages in the Tucanoan language family (Aikhenvald, 2003; Kroeker, Menno, 2001; Miller, 1999) there is very little for Wanano (Pachon & Correa, 1997; Waltz, 2002) apart from Chernela's work. It is a polysynthetic language that exhibits suprasegmental nasalization and tone, an elaborate system of noun classification, and highly complex verbal morphology (Stenzel, 2004.)

Chernela has archived 39 cassette tapes, with accompanying texts, at the ATM. We will obtain copies of these tapes for re-organizing and digitization at AILLA.

2.1.5 Jane and Kenneth Hill

Dr. Jane Hill is a professor of Anthropology at the University of Arizona. Her principal research interests include construction of social order through talk in indigenous languages, language obsolescence, linguistic convergence, and regional dialects. Dr. Kenneth Hill is Research Associate in the Bureau of Applied Research in Anthropology and in the Department of Linguistics at the University of Arizona. His

¹ McDowell's university home page:
<http://www.indiana.edu/~jmcd/sibundoy%20valley.htm>

research interests include sociolinguistics and historical linguistics, with particular focus on the Uto-Aztecan languages. The Hills have been studying Nahuatl language and culture since the late 1960's.

The name 'Nahuatl' is used to refer to dozens of varieties of the Nahuatl language family spoken by nearly a million people in Mexico. There is a high degree of mutual intelligibility among most of these varieties (Roberto Zavala, p.c.) and a literary tradition going back to pre-Colonial times. Nahuatl is a polysynthetic, agglutinating language with a rich array of word-formation processes.

The Hill collection includes recordings in the Nahuatl of Tlaxcala (NHN) and Cupeño (NAI), among others. There are over 100 tapes in the collection, many of which are accompanied by transcriptions and translations.

2.1.6 Victoria Bricker

Dr. Victoria Bricker is a professor of Anthropology at Tulane University. She has been studying the Mayan languages of Mesoamerica, both ancient and modern, for more than 40 years. She has taught classes in Yucateco at Tulane University. Her research interests range from linguistic analysis of Yucateco and Tzotzil to decipherment of Mayan hieroglyphics.

Tzotzil, spoken primarily in Chiapas, Mexico, is one of the largest of the Mayan languages, with over 350,000 speakers (of all varieties, 2002.) Yucateco (YUA) is another of the major indigenous languages of Mexico, with some 700,000 (1990) speakers in the Yucatán Peninsula. Like other Mayan languages, these are agglutinating, ergative languages with abundant word formation processes.

Bricker will archive some 30 tapes with Yucateco recordings and some 50-60 tapes of Tzotzil texts and rituals, with corresponding texts. (Dr. Bricker has informed us that her house was not flooded and her materials are therefore assumed to be safe.)

2.1.7 Marie Claude Mattéi-Muller

Dr. Marie Claude Mattéi-Muller is a professor of linguistics at the Universidad Central de Venezuela. Over the course of her 30-year career, she has studied many indigenous languages of Venezuela, including Panare, Yanomami, Pémono, and Mapayo. Her research interests range from linguistic analysis to cultural studies.

Panare (PBH), Pémono (PEV), and Mapayo (MCG) are Cariban languages. Pémono had only 1 speaker and Mapayo had only 3 remaining speakers in 2000. There are some 1,200 speakers of Panare in 20 villages along the Cuchivero River in the Orinoco River basin. There are around 17,600 speakers of Yanomami (GUU: 2000) in Venezuela and Brazil in the Orinoco-Mavaca area. Cariban languages are generally sparsely documented (Gildea, 1989, 1992; Meira, 1999).

Mattéi-Muller has an extensive collection that she wishes to archive at AILLA, including more than 50 tapes, many with accompanying textual annotations and analyses.

2.1.8 Adolfo Costenla Umaña

Dr. Adolfo Costenla Umaña is a professor of linguistics at the Universidad de Costa Rica. He is one of Latin America's leading linguists and the leading authority in the Chibchan languages, which he has been studying for the past 25 years. His many publications have four foci: descriptive grammars of various Costa Rican languages, historical and areal-typological linguistics of central and South America, indigenous oral poetry in the languages of Costa Rica, and language education.

There are around 11,000 speakers (2002) of Bribri (BZD); 8,800 (2000) speakers of Cabécar (CJP), and 700 (2000) speakers of Guatuso (GUT) in Costa Rica. There were only 5 remaining speakers of Teribe (TFR) in 1991.

Costenla has committed at present at least 30 hours of recordings, with accompanying transcriptions, translations, and analyses. He also has another 30-odd hours of recordings, with texts, that he will most likely archive through the ASC project but does not have time at the moment to consider carefully. He will also seek permission to archive recordings made by two of his professors in the fifties and sixties of Costa Rican indigenous languages, and will deliver some of the recordings made by his colleagues at the Universidad de Costa Rica such as Dr. Enrique Margery de Peña. Because of the high probability that there will be much more than the 30 hours presently committed, we are allowing two semesters for Dr. Constenla's segment of the project.

2.2. The project team

The principal investigator for the ASC project is Dr. Joel Sherzer, Anthropology. Sherzer is the founder and director of AILLA. Co-PIs are Dr. Anthony C. Woodbury, Linguistics, and AILLA manager, Dr. Heidi Johnson. Sherzer and Woodbury will provide general oversight of the project, help AILLA Fellows determine what materials should be archived, and advise AILLA staff concerning the languages and regions involved. Johnson will manage the project on a daily basis and write reports for presentation at conferences and publication on AILLA's website. She will visit each researcher at the start of his or her segment of the project.

The project will hire two Graduate Research Assistants (GRAs) for each long semester of the project period. They will be students in linguistics or anthropology who have done or are planning to do documentary research. Preference will be given to students who speak Spanish or Portuguese, as required by the collection in question.

2.2 The institutional context

AILLA is a part of the Department of Anthropology in the College of Liberal Arts at the University of Texas at Austin, but is gradually becoming increasingly integrated into the General Library System (GLS) in accordance with our strategy for long-term sustainability. The GLS provides the archive with secure office and laboratory space inside the main library building. The Digital Library Services Division (DLSD) of the GLS, directed by Mark McFarland, provides essential support to the archive, hosting the archive proper on its servers and consulting on the whole range of archival activities.

3.0 Description of methods and procedures

AILLA's manager will visit each Fellow at the start of his or her segment of the project to assess the collection, prioritize the archiving schedule, and work up catalog information. Each Fellow will visit Austin during the latter half of their segment to review the work, refine the division of materials into resources, and add information to the metadata. AILLA staff will be in close communication via email with the Fellow whose materials are being archived throughout the process.

The general procedure for each segment of the project is as follows:

1. AILLA manager will visit Fellow for one week to do collection assessment, write up initial metadata, and return materials to Austin.
2. AILLA GRA will digitize all materials.
3. In cases where the division into resources (next section) is not obvious, the GRA will send digital versions via email to the Fellow, who will listen/read and mark the proper segmentation of the recording/text. We will also use email to sort the

- inevitable odds and ends (field notes, photographs) into resources in accordance with the Fellow's wishes.
4. AILLA GRA will archive the resources, completing as much metadata as is available. Each item will be password-protected at this initial stage.
 5. AILLA Fellow will visit Austin for one week to refine their now-digital materials and metadata, determining which, if any, resources are to remain restricted.
 6. AILLA GRA will make the requested changes.
 7. AILLA manager will review the worklog with the GRA, write up a brief summary of that data, and post it on the AILLA site.

3.1 Collection assessment

The first step in the process is assessing the collection to be archived, on-site at the AILLA Fellow's institution. AILLA's manager and the Fellow will work together to

- count media (tapes, papers, notebooks, photographs);
- note the physical condition of each object (mold, loose pack, unordered pages...);
- note how many items (e.g. narratives) are on each media object, if possible;
- note information about speakers (full names, ages, etc.) and the intellectual content of each item (e.g. narrative, interview);
- verify the ISO (Ethnologue) code for each language;
- discuss whether each item should/should not be archived and whether or not it requires restricted access conditions;
- prioritize the archiving schedule.

The most difficult part of this process is sorting the materials in the collection into AILLA resources. A *resource* is set of items that are related in terms of their intellectual content; e.g. a recording of a narrative with an interlinear text file. A single "primary text" may have many components, such as a word list that spans many tapes or a video recording with parallel audio recordings. Derived materials, such as transcriptions and commentaries, are sorted together with the primary work.

The collection is organized on the server first by language and then by deposit. This is done primarily for administrative reasons - it makes it easy to see at a glance if a file is in the right place or not - but it is also an aid to users, once they learn to parse our admittedly cumbersome filenames. The syntax for AILLA filenames is shown below, using item ZOH001R001I012.mp3 as an example:

ZOH the 3-letter Ethnologue (ISO) language code (Zoque of Oaxaca)
 001 the deposit number: this was the first ZOH deposit.
 R001 the resource number: this is the first resource in the first deposit.
 I012 the item number: this is the 12th item (file) in this resource.
 .mp3 the file extension that indicates the format type.

Sorting materials into resources can be very difficult without the guidance of the original creator. Researchers who work in areas in which several indigenous languages are spoken often recorded more than one language on a single tape. AILLA's staff can not determine definitively when one language ends and another begins, unless the researcher recorded a "header" in English, Spanish, or Portuguese at the beginning of each segment. In cases in which we have no access to the original creator (the person is deceased or unreachable), we are forced to simply treat each side of a tape as a single resource, document the difficulty in the metadata, and seek a knowledgeable person to perform the division for us at a later date. Also, the metadata for older materials is often very sketchy, since the creator had no expectation at the time that another person would

ever have occasion to work with them. There were no venues for the publication of primary research materials such as recordings and few archives that would accept tapes and unpublished papers. However, we have found that researchers remember everything about their data, even after 30 years or more. If we have the opportunity to work with the researcher, we can elicit ample metadata for each resource.

Sorting materials into resources and writing up the metadata for each one is a time-consuming task, even for the creator. She or he is often not certain how to divide the materials into resources in a way that is compatible with the archive's administrative methods and user needs. It may be necessary for the researcher to listen to a recording in order to determine exactly what is on it, but this may be impossible for older media and formats, like open-reel tapes or obsolete word processing files. The ideal method is thus for archive staff to work with the creator in a back-and-forth process.

We do the first pass with the Fellow in his or her office. This may be enough: they may have their materials perfectly labelled with their own metadata logs at hand. If not, we will digitize all the materials and have the Fellow listen to them with a digital media player and mark the segments (or review the reformatted text files and identify their contents). Then AILLA staff can cut the original digital object into resources using sound editing software. (We use both ProTools and Sonic Foundry's SoundForge.)

3.2 Processing time

It is difficult to give precise estimates of the time required to digitize a given analog object. A 60-minute cassette in good condition that contains a single resource (e.g. a chant) can be digitized in one hour. We allow another hour to trim extraneous noise or silence from the ends, make the format variants and samples, and upload the files to the server. If the metadata is either very limited or very well-organized, it may take only thirty minutes or so to complete that step. Then the whole resource needs to be tested and the working hard disks cleaned up; to be thorough, we allow another hour for this. We figure an hour to organize the resource prior to digitizing (studying the metadata and comparing it to the rest of the deposit to assign a label, setting up the worksheets, etc.) So, our best case time estimate is around five hours to archive a one-hour recording. This time can be doubled for difficult materials, such as older open-reel recordings. These tapes have to be played through once before digitizing to repair old splices, note changes in recording speed, and rewind the tape firmly. We apply leader tapes with minimal metadata to both ends of an open-reel tape. Some tapes hold several hours of recording at low speeds, which is rarely indicated on the label.

We will not know exactly what we have for each collection until after we do the initial collection assessments. Even then, we will not know exactly how easy or difficult the digitization process will be until we are actually doing it. Our time estimates are thus necessarily educated guesses. We have in general rounded up the estimate of the time required to archive each collection. If things turn out to be easier than we anticipate, the AILLA GRA assigned to that collection will use the extra time to reformat some texts and time-align them with the corresponding recordings using the ELAN software developed by the Max Planck Institute for Psycholinguistics, Nijmegen. This is a wonderful enhancement of a resource that makes it accessible to a larger audience.

3.3. Digitization standards and methods

We produce several format variants of each digital object. One format is termed the *archival object*: this is what we preserve. The others are presentation formats provided for user convenience. When the time comes to migrate forward to a new archival format, these will be discarded and regenerated in whatever the new presentation formats are. The following table lists the digital formats used at AILLA:

	audio	video	digital text	image & scanned text
archival format	PCM wav 44.1/24 bits	mpeg2	XML, rtf, txt, html, or original format pending conversion	tiff or original digital format
presentation formats	wav 44.1/16 bits mp3 1-minute sample mp3	mpeg2	pdf, html	jpg

3.3.1 Audio

AILLA cleaves to the middle range of standards for the digitization of audio recordings. Archives whose focus is music will generally use a sample rate/bit depth of 128Khz/24 bits (or 96Khz/24 bits), while other archives whose focus is speech (the DOBES archive at the MPI, for example) use the perfectly acceptable CD-quality rate of 44.1Khz/16 bits. AILLA prefers a middle ground for two reasons. On the one hand, 24 bits allows a somewhat larger margin which may enable more sophisticated noise reduction in the future. On the other hand, we want to encourage researchers and speakers in Latin America and elsewhere to digitize their own materials, to archive at AILLA and in their own archives. This means that we cannot in good conscience always recommend the leading edge of technology, because it is also the expensive edge. Digitization equipment that produces PCM wav files at 44.1/24 is now generally affordable; for example, the M-Audio Flying Cow analog-to-digital converter is only around \$300. Its technical specifications are comparable to more expensive units, but it only allows one input device to be connected at a time.

3.3.2 Text and images

We have a wide range of conversion programs at our disposal and can read most digital text files, even those in obsolete formats such as WordStar. We convert text files to Rich Text Format (rtf) whenever possible; otherwise, we convert to a current version of Word or WordPerfect and retain this format pending conversion to XML. (We are waiting for tools that simplify this process.)

Manuscripts (e.g. field notes), printed matter, (e.g. reprints of out-of-print articles), and photographs are scanned and archived as tiff files. We determine which scanner settings produce the best results for each item, but generally use 24-bit color at 400 dpi. This produces excellent, highly legible results, even for notebooks written in pencil. Digital images are archived in their original format.

Note that we are not proposing to retype or transcribe any texts as a part of this project, unless a given collection is easier to archive than we anticipate and there is time at the end of that Fellow's project period. If that is the case, the Fellow will select a suitable number of texts to be reformatted in the manner which she or he prefers; most likely, time-aligned with a recording using ELAN.

3.3.3 Preservation of original media

We will assist the AILLA Fellows in transferring their original media to Indiana University's Archive of Traditional Music² (ATM.) We will send digital copies to ATM as

² <http://www.indiana.edu/~libarchm>

well. The ATM ensures the long-term preservation of the original materials by traditional archiving techniques. This is important not only in providing a degree of redundancy in the archiving and preservation process, but also because future scholars may be able to extract more information from the original material than is currently possible.

3.4. Intellectual property rights

AILLA is actively engaged in efforts to improve the management of intellectual property rights. The archive is hosting the third annual meeting of the Digital Endangered Languages and Musics Archive Network³ (DELMAN) in November of 2005. The theme of this meeting will be the network's ongoing effort to develop a coordinated approach to the management of access and rights. In the meantime, AILLA has implemented several methods for controlling access to sensitive materials. All users are required to register with the archive in order to access any resource. Registration is free, but users must agree to abide by the Terms and Conditions of responsible use in order to establish their accounts. Sensitive and "in-progress" materials may be restricted by means of passwords, time limits, or special conditions defined by the depositor.

We will work with each AILLA Fellow to determine the specific access conditions or restrictions that may apply to his or her materials. Since most of the recordings to be archived in the course of this project have been the subjects of published books and articles, it is expected that the majority of materials will be made publicly accessible.

3.5. Metadata

AILLA uses the metadata schema developed for the International Standards for Language Engineering Metadata Initiative⁴ (IMDI) by the MPI. The IMDI schema is compatible via a standard mapping with the Open Language Archives⁵ (OLAC) metadata standard. The difference between the two is essentially one of focus. The IMDI schema was designed bottom-up, through extensive consultations with linguists and anthropologists. The schema was specifically designed to characterize multimedia language documentation materials and to support their organization into resources related by intellectual content. OLAC metadata is based on the Dublin Core metadata standard which is employed by libraries and archives worldwide. It is a shallow set of descriptors intended to serve as a thin common layer of information for all kinds of linguistic resources. The intention of OLAC's architects has always been that this thin layer would be augmented by specific linguistic sub-communities, such as documentary linguistics, and further customized locally by individual archives.

AILLA manager Johnson is active in both the IMDI and OLAC standards organizations, as well as in DELAMAN. She also serves as a Working Group Chair for the annual workshops sponsored by the Electronic Metastructure for Endangered Languages Data (EMELD.) This level of participation is essential to ensure that we do not reinvent tools and protocols or develop a system that can not be used by others engaged in similar activities.

4.0. Dissemination of results

The central results of the ASC project will be the resources that are archived at AILLA. We anticipate that the vast majority of these resources will be publicly accessible through AILLA's parallel Spanish and English Internet interfaces. Additional results, such as the worklogs and summaries of the corpus preparation process, will be made

³ <http://www.delaman.org/>

⁴ <http://www.mpi.nl/ISLE/>

⁵ <http://www.language-archives.org/>

available through AILLA's website as well. Notice of the new collections will be sent to relevant newsletters, such as that of the Society for the Study of the Indigenous Languages of the Americas (SSILA.) Information about corpus preparation will be presented by AILLA's manager at venues such as the annual OLAC tutorial session at the Linguistic Society of America meeting.

5.0. Broader impacts of the project

Latin America is more linguistically diverse than any world area except New Guinea and it is much larger. It is an area of great genetic diversity: by Nichols' (1992:233) count it encompasses 43% of the world's 249 linguistic stocks. Nichols also identifies the New World as an area of high structural diversity (1992:250ff), meaning that these languages show more typological variation than those in the rest of world. Both of these kinds of linguistic diversity make the documentation of Latin American languages crucial from a scholarly standpoint. The lack of adequate documentation is especially acute because all but a few Latin American indigenous languages are severely endangered. Even in situations where a language *per se* is not imperiled, unique forms of discourse may be threatened with extinction (Woodbury, 1993; Woodbury, 1998). The resources in AILLA not only document endangered languages, but also endangered ways of speaking.

Furthermore, the ASC project will make it easier for other researchers and speakers to archive their own significant corpora, at AILLA or at other archives. The worklogs and project summaries that we produce will provide the field with data from a representative range of collections, which should greatly facilitate project planning. Also, these eight significant collections, created by pre-eminent scholars in the field, will serve as an example of the benefits of archiving, not least of which is the convenience of having materials in portable, easy-to-use, digital formats. We expect that this will have the positive effect of inspiring many others to get their corpora into a suitable archive.

5.1. Integration of research and education

The graduate students who work on the ASC project will receive an unparalleled education in the art and science of language documentation. Each GRA will work on a single collection exclusively for at least one semester, communicating regularly with that AILLA Fellow. The student will thus become deeply familiar with the Fellow's body of work, allowing him or her to see how a documentation project evolves over time. GRAs listen to every minute of every recording that they process, so they learn quite a bit about the sounds and discourse styles of the language. The University of Texas at Austin has a large and active documentary linguistics program and we will make every effort to match project GRAs with collections that reflect their interests. It is highly likely that in many cases the GRA will forge a connection with the language, the region, and/or the researcher that leads directly to their own dissertation research. We may be able to hire a Nahuatl student for the Hills' collection and a Mayan student for the Bricker collection, since the Center for the Indigenous Languages of Latin America (directed by Dr. Nora England) actively recruits speakers of Latin American indigenous languages into the graduate school. Indeed, AILLA is a component in a unique program to train indigenous students in all aspects of documentary linguistics, including archiving (Woodbury & England, 2004).

GRAs who work at AILLA also receive training and considerable experience with the technologies used by linguists today, including a wide range of recording devices, digital formats, software for manipulating digital media, and basic computer networking. They will learn how to manage their own research corpora and produce archive-ready materials. These technical skills are portable to other fields of endeavor; for example,

they will be qualified to manage a small multimedia lab. They are also able to serve generally as technical advisors to their peers, providing another means of disseminating information about creating archive-ready language documentation. All of the GRAs who have worked at AILLA consider the experience invaluable on many levels.

5.2. Promotion of teaching, training, and learning

AILLA's multimedia resources can be brought into the classroom at every level of instruction. University courses in linguistics and anthropology are already making use of AILLA's resources, which allow students to listen to a recording that is discussed in a scholarly article and study the secondary data (e.g. transcriptions) online. Primary and secondary schools in many parts of the world teach classes in cultural diversity, for which archived resources supply materials interesting on a variety of levels: aesthetically, culturally, and linguistically (Grimm and Martin, 2002). Most importantly, AILLA's resources are easily accessed in Latin America, especially in countries such as Brazil, Mexico, Venezuela, and Costa Rica, all of which are actively extending the Internet into rural classrooms. Mexico, for example, plans to use the Internet to enhance its existing network of 'telesecundarias': rural middle schools that utilize televised programs as part of their curriculum. It is thus likely that many indigenous students in these countries will gain access to the Internet in the next decade. It would be very nice for them to find resources in their own languages when they get there.

5.3. Participation of underrepresented groups

The best way to preserve endangered languages is to support efforts to maintain and revitalize them and to improve their status with respect to the dominant languages of the nations in which they are spoken (McHenry, 2002; Flores Farfán, 2002; Brand et al. 2001; Lieberman, 2002). AILLA's multimedia resources can play an important role in the development of indigenous language reclamation programs, by providing a collection of culturally important forms of discourse. The collections to be archived by the ASC project include many important oral works, word lists, grammar elicitations, and grammatical notes that can not be found elsewhere. There are increasing numbers of speakers indigenous languages - especially Nahuatl, Tzotzil, and Yucatec Maya - who are receiving university degrees in linguistics, anthropology, and history. This new generation of native-speakers scholars can use the materials archived at AILLA as the foundation for their own language documentation efforts and in their language revitalization and maintenance programs (Flores Farfán, 2002).

5.4. Enhancing the infrastructure for research and education

Most researchers focus on a single area of inquiry and never fully exploit the information in the data that they collect. For example, linguists seldom write ethnographies and anthropologists seldom write comprehensive grammars, although both may collect large amounts of recorded discourse and both tasks can be based on the same corpus. Archived materials can be accessed by scholars in a wide range of disciplines. This is especially important for the Amazonian languages in the ASC project, since this region is difficult to get to and the widespread multilingualism makes it difficult to gain a big-picture view of the region, linguistically speaking. By archiving these collections, AILLA will make it possible for researchers to study a number of these languages at a time. Archiving these eight significant collections will place a large body of primary research data within reach of researchers and students around the world.

This is one of the chief advantages of the discourse-centered approach to language documentation practiced by the eight ASC Fellows and encouraged generally by AILLA and other endangered language archives: primary data, such as collections of

recorded texts, can be mined repeatedly for new information, even if not all of the recordings in a collection are transcribed, translated, and analyzed in terms of grammatical structure. As long as a representative portion of the recordings are analyzed, as is the case for all of the ASC collections, the remainder can be done by the original or other researcher, students, or native speakers at a later time. Once the recordings and the analyzed exemplars are archived, they can be easily accessed by others for further analysis, for transcription exercises, and other purposes.

As mentioned above, many of the AILLA Fellows in the ASC project have published books about the recordings that they plan to archive. We have found that many academic publishers approve of this form of collaboration, since it makes the books all the more useful for their intended audiences. We have also found that the organization and review that is required to archive a significant collection often stimulates new work on the part of the original researcher, since they gain a fresh overview of their own decades of research.

6.0. Potential benefits to society at large

The greatest benefit of this project will be its aid to the preservation of the indigenous languages of Latin America. The lack of centralization of data from this region has made significant typological, comparative, and historical research difficult, if not nearly impossible. Recordings and texts from indigenous Latin American languages are highly valuable forms of cultural documentation (Sherzer and Woodbury, 1987; Sammons and Sherzer, 2000; Sherzer, 1990; Sherzer, 2004). These materials frequently provide information relating to local history and politics, knowledge of local ecology including zoology and botany, religious and medicinal practices, and other cultural practices of the speakers. The materials archived through the ASC project will be of interest to a diverse community of researchers, including ethnomusicologists, ethnobotanists, historians, and archaeologists. Last but not least, these corpora of recordings constitute an oral literature whose artistic and cultural beauty enriches us all.

7.0. Results from prior NSF support

National Science Foundation - Information Technology Research

#BCS-0113962: "Web-based Archive of the Indigenous Languages of Latin America"
\$218,975; 09/01/01 - 08/31/04.

7.1. Summary of the results

AILLA's achievements during its first four years have been substantial: the archive is established physically, with an office and laboratory in the main library building, and the collection and database housed on secure servers maintained by the DLSD team; we have implemented the metadata and user validation databases, as well as intake and archiving procedures; we have chosen or developed standards for all materials; we have found or purchased equipment; and we have built a website with parallel Spanish and English interfaces. AILLA's collection has grown to over 800 resources in over 75 languages from 14 countries, comprising over 350 hours of recordings and 4,000 pages of text. There are more than 1,000 users registered from literally all over the world.

7.2. Publications resulting from award

Beier, Christine, Lev Michael, and Joel Sherzer

2003 Discourse forms and processes in indigenous lowland South America: An areal-typological perspective. *Annual Review of Anthropology*, 31.

Johnson, Heidi and Arienne Dwyer

- 2002 Adapting the IMDI schema. *Proceedings of the Language Resources and Engineering Conference*, Las Palmas, Spain, May 26-29, 2002.
- Johnson, Heidi and Gary Holton
2004 Legal and ethical aspects of access management. *DELAMAN Access Management Workshop*, Nijmegen, Netherlands. 29-30 Nov 2004
- Johnson, Heidi
2001 The Archive of the Indigenous Languages of Latin America. *Proceedings of the IRCS Workshop on Linguistic Databases*, Philadelphia, 11-13 December 2001.
2002 The Archive of the Indigenous Languages of Latin America: Goals and visions for the future. *Proceedings of the Language Resources and Engineering Conference*, Las Palmas, Spain, May 26-29, 2002.
2003a The Archive of the Indigenous Languages of Latin America. *The Annual Meeting of the Society for the Study of the Indigenous Languages of the Americas*, Atlanta, Georgia, January 2-5, 2003.
2003b El Archivo de los Idiomas Indígenas de LatinoAmerica. *Primer Simposio Internacional de Lingüística Amerindia*, Mérida, México, February 24-28, 2003.
2003c Documentation and archiving. *Archiving Tutorial and Workshop, The Hans Rausing Endangered Languages Project*, London, 22 November, 2003.
2005 Preparing documentary materials for archiving. *Tutorial: Archiving and linguistic resources or How to keep your data from becoming endangered*, Linguistic Society of America 79th Annual Meeting, Oakland, California, January 6-9, 2005.
2005 Archivos de Recursos para Documentación de Lenguajes. Instituto Nacional de Lenguas Indígenas, México D. F., 2 junio 2005.
- Sherzer, Joel
2002a The Archive of the Indigenous Languages of Latin America. *XIII Congreso Internacional de la Asociación de Lingüística y Filología de América Latina*, San José, Costa Rica, February, 2002.
2002b The Archive of the Indigenous Languages of Latin America. *Foundation for Endangered Languages VI: Endangered Languages and their Literature*. Antigua, Guatemala, August, 2002.

7.3. AILLA's infrastructure

The archive proper resides in the Perry-Castefieda Library building at the University of Texas at Austin on a Sun SunFire V880 with 8 cpus, 32 GB of memory, and 400 GB of internal storage, which serves data from a NetApps F840 Files machine with 4 terabytes of storage, 1 terabyte of which is dedicated to AILLA's collection. These computers are managed by the DLSD team, who are available to AILLA for consultation on archiving issues as they arise. In particular, the DLSD keeps abreast of changes in the technologies underlying digital archives and has accepted responsibility for supervising migration to new formats or support systems when necessary. Archive software consists of a relational (MySQL) database based on the IMDI metadata schema. The web-based interfaces for users and archive staff are implemented in PHP software. It should be noted that the choices made by the AILLA and DLSD teams for software infrastructure represent a strong commitment to open source software that is readily available via the web, inexpensive, robust, and documented in many languages. Archives around the world could adopt AILLA's technology and create compatible archives based on the cost of the hardware alone.

7.4. Relation of completed work to the proposed project

The ASC project is a natural continuation of the archive's original mission. We have learned through experience that the single greatest obstacle to archiving is the

work involved in preparing a substantial corpus: researchers agree that archiving is good and necessary, but find it impossible to work an open-ended task into their crowded schedules. This project will enable us to archive eight significant collections and provide data that will facilitate the archiving of many more in the future. We have also learned, through experience with the three previous AILLA Fellows (Dr. Lucía Golluscio, Dr. Veronica Grondona, and Dr. Ernest Migliazza), that the best way to do the best job of archiving a whole corpus is to work closely with the original researcher in a focused fashion throughout the process, concentrating on a single collection at a time.

We have submitted a proposal to the National Endowment for the Humanities Preservation and Access Program to develop "AILLA Special Exhibits": integrated archived displays of complexly organized sets of materials, such as multimedia grammars and language documentation projects. This project will mostly involve interface software development, so there will be little overlap in terms of daily activities. If we are awarded both grants, we will adjust the budgets and project plans as required.

8.0. Long range sustainability of project results

DLSD is a permanent department of the General Library System at the University of Texas at Austin. Continuing support for the development of digital archive technology is a central part of its charter. The group is committed to providing the infrastructure for AILLA for the long term. The GLS has also agreed to support AILLA's manager's salary to the extent necessary; however, they request that we attempt to cover that expense through other means whenever possible. In August, 2005, we will have made the first deposits into AILLA's endowment fund. The initial deposits come from a group of anthropologists, constituting a clear vote of confidence from our peers. AILLA's Director and Manager are working closely with the Development Division of the College of Liberal Arts at the University of Texas at Austin to build the fund over the years to come. The results of the ASC project will be permanently preserved in the archive.

9.0 Conclusion

The ASC project will make available an unprecedented wealth of primary and secondary data for thirteen or more endangered languages of Latin America. The eight significant collections that will be archived will immeasurably enrich the resources available for the study of these languages. Considered together, these eight collections exhibit both depth and breadth of coverage. The five collections from Amazonia will make it possible to listen to recordings from a range of languages from this complicated region in one sitting, and to study them through the accompanying transcriptions and translations as a whole. Added to the existing Amazonian materials deposited by Migliazza, these resources will undoubtedly stimulate improved research into this linguistic region. The Chibchan language materials contributed by Costenla, added to the Kuna resources already housed at AILLA, will constitute an extraordinary resource for this "intermediate area". The Mesoamerican languages in the Hill & Hill and Bricker collections are among the most important in that region. Archiving these collections will not only provide researchers with an exceptional resource, but will also return narratives, songs, word lists, and other useful materials to speakers for their own programs.

Now in its fifth year, AILLA has a proven track record in the proper treatment of endangered language documentation materials. We have a well-equipped lab, an excellent support infrastructure, established policies and methods, and the technical skills to do the best possible job of archiving these eight significant collections.

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