

My last site measurement visit was almost two years ago, to Hampi in Karnataka. It was the first time I had measured IRs in ambisonic format, using my system built out of a modified Zoom H2 and home built tetrahedral microphone using six mm cardioids capsules.

For my Hampi visit, I used a small RadioShack loudspeaker, which at one time was recommended for measurement use, a small 40-Watts amplifier that can be powered with a 12volt battery. A laptop to generate the Log sine sweep signal, and the Zoom H2 and my Tetrahedral microphone (Brahma !) to record.

I have simplified the process since then – I now record the Log Sine Sweep signal onto an MP3 player. (Many of them will play wave format sound) and glue this to the amplifier. The laptop can stay in my hotel room.

I will also replace my Radio Shack loudspeaker with an omnidirectional dodecahedron. There are published files for printing the parts needed for this. I just have to get my 3d printer going.⁷

(Endnotes)

- 1 ASA special session on Archeological Acoustics, Columbus, OH, 1-5 Nov, 1999; Cancun, Mexico 2-6 December, 2002. "Theatre and Cultural Memory", IFTR World Congress, Amsterdam June 30 to July 6, 2002.
- 2 "Recording Concert Hall Acoustics for Posterity" M. Gerzon – JAES Vol 23, Number 7, pages 569-571 (1975)
- 3 <http://www.acoustics.net/>
- 4 "Recording Concert Hall Acoustics for Posterity", Angelo Farina, Regev Ayalon AES 24th International Conference on Multichannel Audio
- 5 http://www.flickr.com/photos/ms_static/sets/72157625446503232/detail/
- 6 <http://www.shapeways.com/shops/umashankar>
- 7 <http://www.thingiverse.com/thing:24308>

SOCIAL SCIENTISTS AS USERS: SEARCHING FOR RECORDED SOUND IN ITS ENVIRONMENT

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Abstract

For social scientists, it is crucial to access complex information on sound production and the recording environment. They need data derived from professional recordings that help to support conventional observations.

Media distributors have long-held the role of environment sounds as disturbing nuisance that had to be eliminated or suppressed. In the best / worst case, side sounds were left unchanged to create a “lively” atmosphere for an anthropological sound recording or a sound recording for a special audience to which the place of the performance is of particular interest. The coughing in a live concert or the dog barking in the background of a village ensemble became then part of the marketed item.

In an archive, sound reductions hopefully not take place. Nevertheless, environmental sound inclusions, in certain recordings, are considered to be side effects of the main recording project undertaken by collectors of different disciplines who did not purposely intended to record those noises. Ideally, they were searching for equipment that avoids it best.

Unlike this approach, the project at our institution tries to purposely include all possible environment sounds produced during the primary sound production. These sounds come from various distances and or directions. The paper will focus on the scientific potential and the resonance of these recordings among users in order to achieve more reliable research outcomes. Though small in number, researchers of very different social sciences areas might become a strong and supportive group of future users.

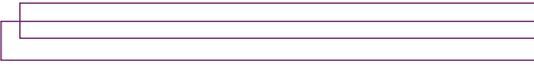
Introduction

For social scientists, it is crucial to access complex information on sound production and the recording environment. They need data derived from professional recordings that help to support conventional observations. In times of new methodologies in humanities and among network researches, environmental sound as well as sound environment becomes an important subject of study for the benefit of holistic views on human development.

Sound recording engineers and archivists, however, did and do not focus much on the role of the environment as an acoustic and thus complex sound of life that delivers a huge amount of extra information¹. These Media distributors perceive it as “noise” that should be separated from the audio essence; a disturbing nuisance that had to be eliminated or suppressed to serve the expectations of the consumers and the researchers. The problem of getting to this kind of complex sound and later on to its preservation starts with the way the recordings are done. In the following paper we present some examples of recording methods followed by a discussion of its use by social scientists in our small scale archive at Universiti Putra Malaysia.

The research on our recording and preservation methods revolves sound recordings of select local string instruments in their rural environment. For example the sape native to different ethnic groups of Orang Ulu (Chan & Musib, 2011), and the Bidayuh tube zither *pratuokng* in its local context (Jähnichen, 2011c; Musib, 2011).

The second part of experiment is done in terms of observing the further use of these recordings as scientific tools and as accessible items in our Archive. Each sound embedding depends on spatial and time parameters. These parameters are evident in the musical performance of these selected local string instruments therefore we do not limit our observa-



tions on the sound source. Blauret (1997:365) initiated that visual and audible information defined by the perceiver is in a shape of spatial layout such as depth, position and dimensional parameters. Therefore, we keep in mind that sounds deriving from the *pratuokng* of the Bidayuh musicians and the environment are equally weighty. In a field recording that was conducted in June 2011 in Annah Rais (Padawan, Sarawak) we recorded sound of the tube zither from multiple positions, points, angle and distances that were conceptualized as “contextual sound”. This has opened up another horizon of sound knowledge, particularly on sound in its context. Understanding the capabilities of the audio recording equipment encouraged us to record sounds and group them by technical highlights. The concept of capturing contextual sound through highlights in this study might perhaps be a useful application in collecting audio data that will be archived in the future to serve social scientists in their historical and systematic researches.

Conventional Recordings – The Point of Departure for Archival Documents

Audio equipment does play a big role in getting the most reliable sound information out of a selected area. Audio recording engineers have had to face many roadblocks when attempting to get the desired sound on tape during the early years of collecting and transforming these recordings into scientific documents. Digital equipment seems to be a solution for uncomfortable recording conditions; however, the good and the new do not prevent the bias from early collection practices such as sound isolation and prioritization in selecting sound sources. Finally, it all depends on the perspective of further use. Therefore, it is so tremendously important to think of multiple perspectives. One of them these is the perspective of social scientists and their needs: What details can be of use for researchers and scholars in the social sciences and humanities?

One question is if the sound can be singled out, or extracted and analyzed via spectrograms for frequency analysis, or waveform statistics to formulate certain variables. Another question might be the reduction of bias in approaching sound sources. Perhaps we should heed the advice from “We know so little! Record everything” made by Charles Seeger (Pescatello 1992: 141; also Baranovitch, 1999: 159) on all kinds of sound not only on “styles”. Considering further developments in audio technology, the recorded item will possibly not be limited by its acoustic border but by the perspective of its use.

Signal Acquisition

Advancements in recording technology are growing rapidly and they make us less aware of the importance of recording fundamentals, particularly towards some technical aspects. To give some examples: Which device is suitable for the high sound pressure level when recording the fifteen foot war drums of the Bidayuh shown in figure 1a, or for capturing the dynamic range of the naturally soft sounding *sape* shown in figure 1b? The built in compressor or limiter and other effect processors might alter the actual sound of instruments. Though fast working scientists need something handy, snappy and able to post online within seconds, we should bear in mind by omitting any one of these inadequacies of sound quality that will not deliver a reliable knowledge source.



Figure 1a: War drums of the Bidayuh demand a microphone that withstands high sound pressure level. (Photo by Gisa Jähnichen 2011).



Figure 1b: Three sape (boat shaped zithers) in different sizes. They are played while sitting on the ground and leaning against the wall. The body of the player plus the wooden background give the instrument then a special sound that cannot be simply achieved in a studio or through isolated sound conditions. (Photo by Gisa Jähnichen, 2009).

The bamboo tube zither *pratuokng* of the Bidayuh, as shown in figure 2a and b is a multi output instrument that can be highlighted under the category ‘sound of instruments’ (highlight category 1). The instruments meant are gongs in different sizes coming in a set. The gong set is not played in common performances thus the single *pratuokng* replaces the gong set for daily entertainment or informal meetings.

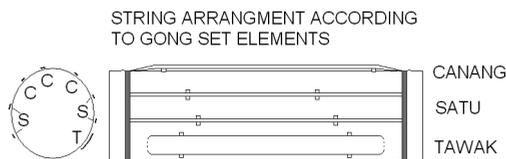


Figure 2a: The functional transmission of gong characteristics on a *pratuokng*. *Canang* is the smallest, bright sounding gong used at least in pairs, here in a group of three. The *satu* is played in an accentuated way to articulate rhythmic patterns that may interlock and played in two pairs, and the *tawak*, the big gong, gives the metric frame.

If the instrument is the main focus of the highlights mentioned earlier, then the instrument's sound can be divided into two components. The components are *tawak* mostly played with the left hand, and the beating of the strings by the right hand. The *tawak* component represents the sound produced by hitting an elevated tongue of the tube and the plucking of the lower *satu* string using the thumb portrays the rhythm function within the repertoire. The other idi-chord strings of the *pratuokng* that are beaten with short beaters padded with rubber strips suggest a higher tuning hence playing the role of *satu* and *canang* in a melodic line.

In this situation, large diaphragm microphones were used enabling us to capture low frequencies produced by the instruments. The low frequencies produced were generated from the *tawak*, the beating of the bamboo with the left-hand of the performer; as well as the frequencies produced from bamboo flooring on which the musicians sit. Since all flooring was made out of bamboo segments on each village section (called *kupo*) of the longhouse, the sound was strongly affected by the quality of the bamboo, especially its degree of drying and its age.

In an excerpt of ensemble music (highlight category 2) involving two *pratuokng* players accompanying a traditional Bidayuh welcome dance or *Ranggi Pinyambut* with the piece named *Titie Nunuok* as shown in figure 3 we may clearly hear the squeaking sound which is the sound of the bamboo floor and the shimmering sound of the 'sound ornaments', such as the bangles around the feet, hand as well as the belt that is made of coins worn by the dancer.



Figure 2b: Abas Anak Ringap age 78' demonstrate the art of playing the *pratuokng* (Photo by Ahmad Faudzi Musib 2011).

In the third highlighted category which is the 'instruments – music in its context' the we used the condenser microphone. It is sensitive, able to pick up a signal that is soft in nature. The sound was recorded using a large diaphragm condenser microphone hanging above the two players to pick up an equal blend of both the instrument and the entire sound condition. The

condenser microphones are the most sensitive microphones and also tend to exhibit much more reliable sonic characteristics (Thompson 2005:17). Omni directional polar patterns (Alten, 2010:70-71) were used on the microphone in order to capture the overall sound event.



Figure 3 Welcome dance or *Ranggi Pinyambut* accompanied by two *pratuokng* players (Photo by Gisa Jähnichen).



Figure 4. A large diaphragm condenser microphone is hanging above the musicians (Photo by Ahmad Faudzi Musib 2011).

Contextual Sound

Live sound was captured at a distance so that we were able to collect another perspective of sound perception. The resulting recording presents as an oversaturation of contextual sound (highlight category 4). Nevertheless, this recording environment is one of the most prominent conditions in which sound is perceived within the rural situation. Villagers usually perceive music performances from the distance sitting in front of their own entrance on the joint terrace of the long house (Jähnichen, 2011a). As sound samples show, this sound appears far different from the sound in immediate proximity to the performers and from the space where the musicians practice. The bamboo flooring can be seen as a spatial extension of the music instruments thus enlarging the sound experience into a thinner yet more complex sound.



Figure 5a: Bamboo flooring of each “Kupo” that is built 2.5 meters above the ground (Photo by Gisa Jähnichen, 2011).

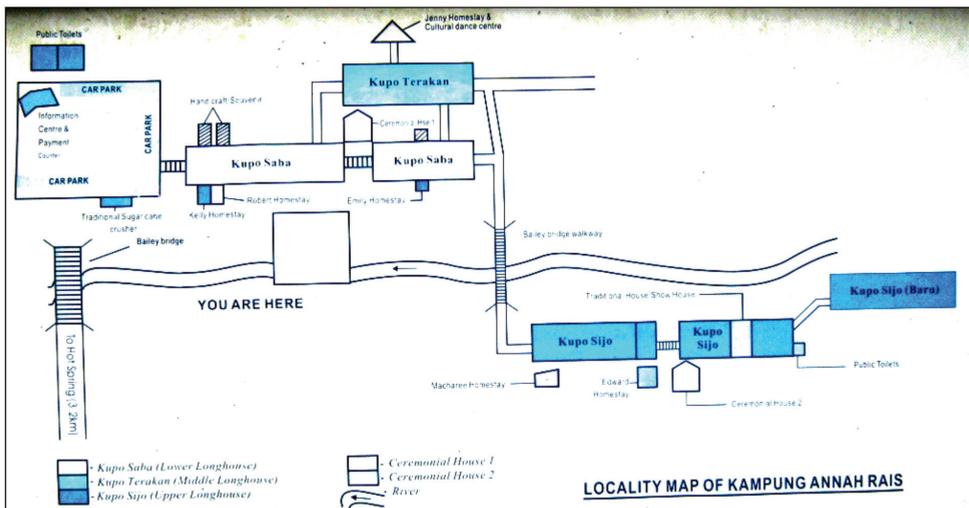


Figure 5b: Map of the village Annah Rais (Photo by Gisa Jähnichen, 2011).

The Outcome of Noise Reduction

The following figures derive from two audio examples. The first example shown in figure 6 is the side sound profile recorded in stereo view in a spectrogram analysis format (Adobe Audition).

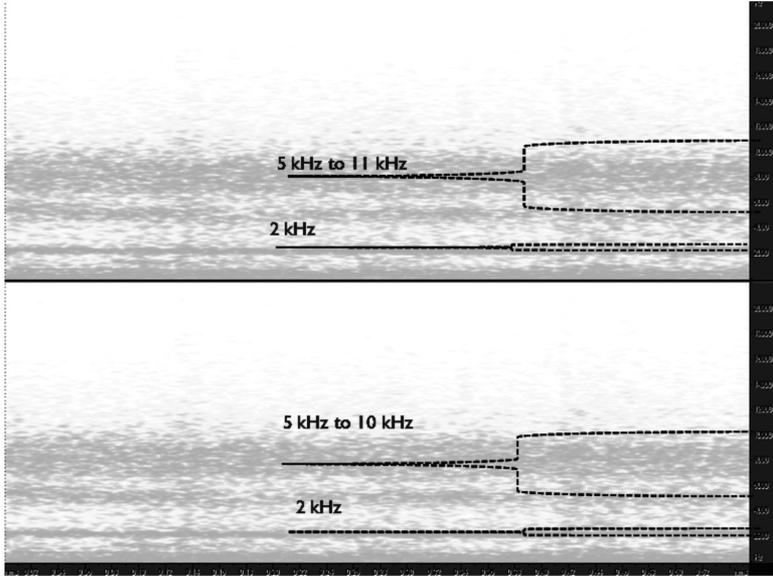


Figure 6: 'Side sound' profiles.

In figure 7 is a sample of two *pratuokng* recorded without noise reduction. The spectrogram plots a mixture of both, the side sound profile and the sound event in a strict limitation.

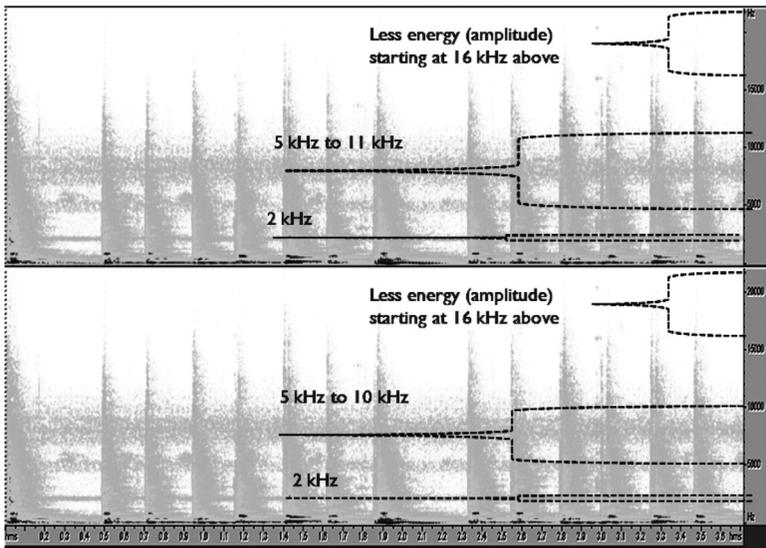


Figure 7: Spectrogram view of 2 *pratuokng* of Titie Nunuok with its 'side sound'.

Capturing the side sound profile makes it possible to use this profile as a model for removal of “noise” embedded in the sound event. Figure 8 is the noise reduction scheme.

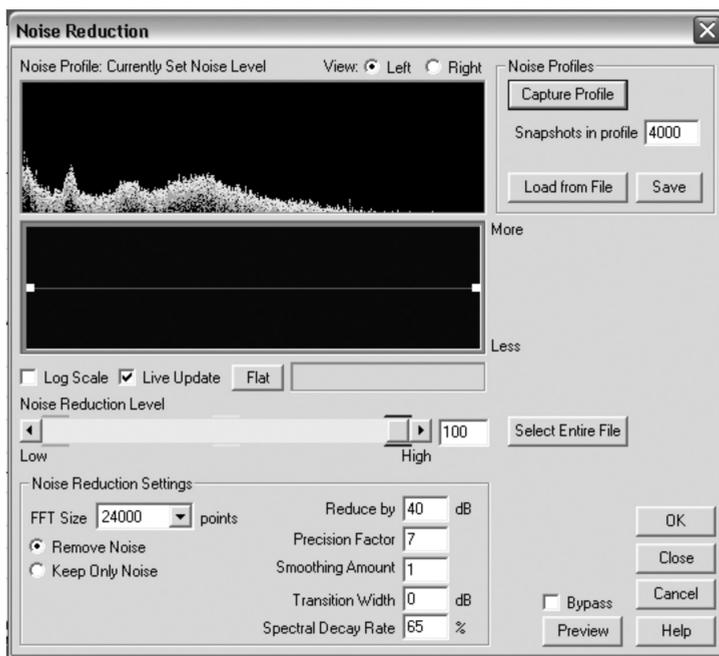


Figure 8: Noise reduction scheme.

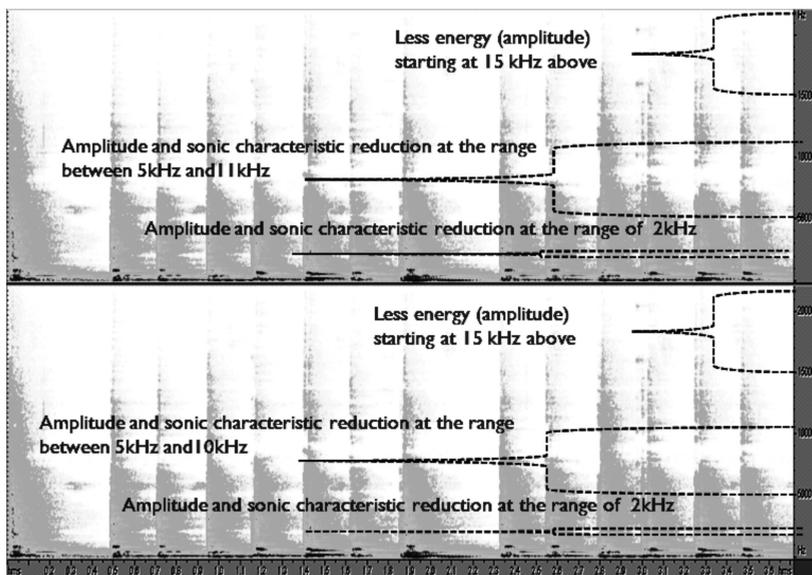
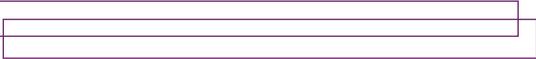


Figure 9: Spectrogram view from 2 Pratokung of *Titie Nunuok* with noise reduction.



With the noise reduction scheme applied shown in Figure 9, most of the frequencies of 2 kHz as well as frequencies within the range of 5 to 11 kHz as the modelled audio signals within this range are attenuated tremendously. In best and worst cases, side sounds were left unchanged to create a 'lively atmosphere' for a so called 'anthropological sound recording' or sound recording for a special audience to which the place is of particular interest.²

The sounds might be then isolated, manipulated, moulded, shaped, and its format finalized and sold on the shelf of a record store and labelled as 'the authentic sound of.....'. This is, from the viewpoint of an archivist, an irresponsible production method deriving from marketing strategies that have given a wrong picture of an actual sound and its many changing conditions to average listeners. The role of professional sound recording is not only to record, mix, master, print and enjoy the replay, but the awareness of how important is each sound source that one is about to produce (Jähnichen, 2011b: 1-13).

Discussion and Conclusion: Contextual Sound, the Archive as Such and Social Scientists as Users

If we consider that in large audiovisual archives, specialists for each field of the archiving process have to accumulate a large amount of specialized knowledge for their particular field. It seems to be a high expectation that these multi-perspective and user focused recording aspects are carefully considered. Nevertheless, they are crucial in serving a clientele coming from social sciences. In the past, technical advances and developments in capturing sound of material objects such as musical instruments (Chan & Musib 2011), tools or even human or animal voices were of utmost interest. With immaterial constructions deriving from sound waves such as interval relationships or timbre, and visually analysed movement patterns, the current tendency in research is to gain specified social knowledge and communication strategies that are always to be seen in co-operating networks within the audible world. Professional recordings and careful multi-perspective preservation of these recordings are one important precondition for the effectiveness of these audio objects in social sciences even though this idea is not yet broadly recognised (Jähnichen, 2011c).

A way out of overestimation is a continuously updated register of co-operating experts that can be involved on a basis of mutual benefits. The question is not how can we know everything connected to a recording if we are not an expert but rather how to gain access to experts who know everything connected to an assessable field.

Small scale university archives could be a competent partner in search for that solution. In our experience, the use of archived items among social scientists depends strongly on the recording quality and the comprehensive documentation of it. Most of them do use sound recordings to really research deeply into it and not for illustrating cases. High quality should include various perspectives of recording options thus increases the value of the proof. Social scientists do not publicly abuse archive material to attract audiences, they use them to demonstrate the essence of social knowledge gained from it. That makes a remarkable difference to users from mass media, users who just enjoy sound and audiovisual material.

Figure 10 shows the preliminary documentation part of the recordings in Annah Rais (Padawan area, Sarawak).

CODE NUMBER	DATE	VENUE /PLACE	LENGHT
ABC 123	13 JUNE 2011 8.15pm	ANNAH RAIS PADAWAN, SARAWAK	00.05.13.11
TITLE	INFORMANT/ PERFORMER/ INSTRUMENTS	SOURCE / REMARKS	RECORDIST / REMARKS
TITIE NUNUOK Ranggi Pinyambut (Welcome Dance)	A PERFORMANCE BY 2 PRATUOKNG PLAYERS ON A BAMBOO TUBE ZITHER ARTHUR BORMAN 45 (M) ARDWELL 26 (M).	PERFORMANCE WAS RECORDED USING AN AKG C414 LARGE DIAPHRAM MICROPHONE, ATTACHED TO A TASCAM US122 AUDIO INTERFACE. SIGNAL WAS RECORDED ON A FIGURE OF 8 POLAR PATTERN, HANGING ABOVE THE PRATUOKNG PERFORMERS.	AHMAD FAUDZI MUSIB
FORMAT	AUDIO PROCESSING		LINK
.WAV	NONE		

Figure 10: Example of a documentation of a recorded audio material data for archiving

We hope that we could draw your attention to the specific needs that social scientists have and their increasing interest in developing sound and audiovisual perspectives in the future of their fields. This should lead to a sensitive approach to the whole practice of processing audiovisual material, especially sound recordings that serve social sciences. In the future, social sciences will possibly work exceedingly more with audiovisual material as one of the most comprehensive knowledge sources available. Appropriate sound recordings that approximate social reality that are explored from various perspectives may play a central role in this process of methodological modernization.

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“Titie Nunuok“. ARTHUR BORMAN and ARDWELL FELIX – *Annah Rais, June 2011*.

(Endnotes)

- 1 Except studies in criminology and linguistics of dialect identity.
- 2 From another perspective, let's say of a world music producer, the coughing in a live concert or the dog barking in the background of a village ensemble is part of the marketed item.