

# the world of music le monde de la musique die welt der musik

JOURNAL OF THE INTERNATIONAL INSTITUTE  
FOR COMPARATIVE MUSIC STUDIES AND DOCUMENTATION (BERLIN)

Vol. XXXI. No. 3 – 1989

## Film and Video in Ethnomusicology

<b>JOHN BAILY,</b>	
<b>Filmmaking as Musical Ethnography</b>	3
<i>Kurzfassung</i>	20
<i>Résumé</i>	20
 <b>OSKAR ELSCHKE,</b>	
<b>Film and Video in Ethnomusicological Research</b>	21
<i>Kurzfassung</i>	35
<i>Résumé</i>	36
 <b>ARTUR SIMON,</b>	
<b>The Eye of the Camera. On the Documentation and     Interpretation of Music Cultures by Audiovisual Media</b>	38
<i>Kurzfassung</i>	53
<i>Résumé</i>	54
 <b>HUGO ZEMP,</b>	
<b>Filming Voice Technique: The Making of     "The Song of Harmonics"</b>	56
<i>Kurzfassung</i>	84
<i>Résumé</i>	84

Hugo Zemp

## **Filming Voice Technique: The Making of “The Song of Harmonics”**

In presenting my films, as well as others, to various audiences, which sometimes included ethnomusicologists, I used to notice that people unfamiliar with visual analysis usually asked questions about the content of the films, rather than about the filmmaker's intentions and cinematographic approach. Design and structure, style of shooting, editing and transmitting verbal information – these essential features of film communication were often overlooked in discussion.

Lately, however, there has been a change. Just as reflexive writing about anthropological films by visual anthropologists (and about ethnographic texts by anthropologists) has proliferated in recent years,<sup>1</sup> discussion on making and analyzing films has also met with increasing interest among ethnomusicologists. One proof is the publication of this issue of *the world of music*, the first of its kind. With the availability of light video equipment, more and more ethnomusicologists and students have become engrossed in visual strategies. Although Steve Feld published his ground-breaking article on “Ethnomusicology and Visual Communication” back in 1976 (Feld 1976), detailed descriptions and discussions of problems in making specific ethnomusicological films have only recently been published. The most detailed accounts of this sort are probably John Baily's exemplary study guides (Baily 1989b and c), which contain shot-by-shot analyses. I myself have published some observations about camera work, editing and audiences, as well as about ethical issues and animation technique, with reference to my film series on Swiss yodelling (Zemp 1988, [forthc<sup>1</sup> and <sup>2</sup>]). It now seems to me that my recent experience in making the film “The Song of Harmonics,” in which many conceptual and technical problems had to be resolved, may contribute to the growing body of literature on films in ethnomusicology.

### **The Project**

The project of making “The Song of Harmonics” emerged from two ideas. First, while making the film “Head Voice, Chest Voice” (1987), I looked for ways

to visualize music structure and performance style. For that film, conventional animation technique of graph notation proved suitable. Afterwards, I wished to explore other possibilities using the latest technologies. The second impetus to make "The Song of Harmonics" was my long-standing desire to make a film (or several shorter films) about and with my friend Trần Quang Hai, a musician and ethnomusicologist with whom I have been working in a research group for twenty years. I have often heard him practice biphonic singing<sup>2</sup> and speak about his experiences and his research. Here was an opportunity to combine my old project of filming Hai and my interest in exploring music visually. I was looking for a way to show how biphonic singing operates from the physiological as well as the spectral point of view. Not being a specialist of central Asian music, I did not intend to go off and shoot a film in Mongolia or among Siberian peoples of U.S.S.R.; the venue for this research was to be Paris.

A central issue in any ethnographic or ethnomusicological film is how to convey verbal information that cannot be expressed directly through visual means. Many educational films and documentaries intended for a general audience are overloaded with narration. Leading ethnographic filmmakers, such as David MacDougall, advocate the use of conversations between protagonists (Young 1982). I tried this approach in my film "Yootzing and Yodelling" (1987). The "native point of view" can also be given through interviews, extensively used in TV reports. The person interviewed addresses the viewer through the interviewer who, if he is off camera, usually sits or stands to the left or right side of the camera. Interview questions are frequently cut out. A common procedure in run-of-the-mill teaching films is to put an expert in the know in front of the camera, and let him directly address an invisible audience. But this kind of lecturing (as in my film "'Are'are Music" [1979] with a native teacher) tends to look rather stilted and artificial.

How then could one explain the basic technique of biphonic singing in an interesting way on film? I knew that Hai regularly conducted workshops attended by actors, singers, and other persons curious to acquire this remarkable vocal technique. So my first idea was that one way to introduce the subject would be to film a workshop. While speaking with the workshop's participants, who could be shown in wide-angle shots, the teacher could address the film audience at the same time. The teacher could look toward the camera in a closeup shot, and make each viewer feel as if he were participating directly in the workshop. Furthermore, while watching the trainees' efforts, the audience would get an idea of both the difficulties and easier aspects of this vocal tech-

nique. Funny situations and reactions of the trainees would enliven otherwise dry explanations.

From the outset, I thought of exploiting the twofold nature of the audience Hai is addressing. He had told me he learned biphonic singing by practicing in traffic jams. So I asked him to turn to the viewing audience at the end of the workshop, and say: "Now, that you have understood the basic technique of biphonic singing, you can practice at home ... ." With a closeup shot as he glanced at the camera, the viewers would feel drawn in (and many laughed, as I expected). Then a zoom out to wide angle would show that in fact he was speaking to the workshop participants. He would then recommend that the learner improve his singing technique while driving. In the following shots I wanted to show several trainees in rapid succession practicing biphonic singing in their cars. A final low-angle shot accompanied by an original musical composition by Trần Quang Hai would show the traffic jam, giving one the impression that all of Paris was practicing biphonic singing. I also hoped this scene would provoke laughter, again to avoid the aridness typical of didactic films. It happens that these shots were the most carefully defined and scripted of the project, whereas other scenes entailed only minimal planing.

## **First Shootings**

The initial film crew was kept to a bare minimum: I myself served as director and cameraman; Jean-Pierre Estival, a postgraduate ethnomusicology student, worked as the sound recordist. Trần Quang Hai acted not only as the main figure in the film but helped to transport and set up the equipment, which was borrowed from the Audiovisual Department of the French National Science Research Center (CNRS Audiovisuel).

### *The Workshop*

In preparation for shooting in 16mm film, I shot some trial footage of a workshop with a video 8 camcorder, and afterwards discussed the results with Hai at the video monitor. I encouraged him to develop a short explanation of essentials, since long-winded "talking heads" are tedious to watch. Hai happened to caution a woman attending the first workshop not to be afraid of looking ugly while articulating. That was funny, so I asked him to repeat the line at an appropriate moment when we came to shoot the 16mm film.



*The workshop of Trần Quang Hai (video print)*

The small theater in which some of his workshops were held had no natural lighting. The small ceiling spotlights fixed over the audience, which usually sat on cushions on the floor, were not bright enough for filming. Although the stage had more powerful spots, I wanted to avoid using the sort of theater lights to which musicians, dancers and actors are perhaps accustomed, but which are disconcerting for neophytes coming to learn a vocal technique at an informal workshop. So I intended to add diffuse light with three 500 watt bulbs aimed at white polystyrene reflecting panels, with two lamps on the left side and the third behind the camera. But the first bulb burned out while we were putting up the lights, and after we changed it, two more spare bulbs did too. The circuit-breaker could not be repaired at short notice, and since the workshop was about to start, I had no other choice than to place one lamp to the left and the other behind the camera. The outcome was flatter lighting with less contrast than what I had anticipated.

When I studied the rushes after they came back from the laboratory two days later, I saw that all the medium shots were out of focus, and that in zooming out from closeups to wide-angle shots, the focus shifted from Hai in the remote distance to the trainees' sitting position close to the camera. The zoom lens lent by the CNRS Audiovisuel was not adjusted to that camera. The shot in which Hai joked about looking ugly hence turned out to be unuseable. So was the final shot, where Hai had launched into a long explanation about how to practice in a car, or at home to the sound of an electric razor or vacuum cleaner. Of course I could have changed the scenario to show trainees shaving or vacuuming at home, but since all the film's main sequences were already interiors, I preferred to end with some exterior shots. The final zoom out during Hai's talk could not be dispersed with, so I resolved to take these shots again the following week as closeups. The young woman seated beside Hai agreed to come back for a second session. Although any artificial reenactment of this kind is open to question, I feel it is legitimate when an adequate written explanation provided in a publication like the present one reveals whatever artifices were used in shooting and editing.<sup>3</sup>

### *X-Ray-Cinematography*

The larynx and especially the vocal cords are certainly worth examining to study the difference in voice production between a tone sung in natural voice and the drone produced by biphonic singing. The latter is characterized by tight contraction of the superstructure of the larynx and glottis (cf. Sauvage 1989:4), but phonic excitation mechanisms are not involved in selecting harmonics, which occur through the phenomenon of resonance. That is why the film did not include pictures of the larynx taken through the mouth (by laryngoscopy with an endoscope) or through the nose (by nasofibroscopy). The crucial point was to display tongue position, since that is the primary cause of changes in the resonance volumes formed by the pharyngo-buccal cavities.

Most new medical imaging technologies are unsuitable for this purpose. Echography, well known for its use in foetal examination, allows one to observe motion in real time, but the images it provides are not easy for the layman to interpret in a brief film sequence. A CAT-Scan, using X-rays as in conventional radiography, generates images of a cross-section too thin for our purpose. Scintigraphy utilizes gamma waves by concentration and distribution of radioactive substances injected intravenously into an organ. The most recent tech-



*The radiologist discovers, together with Trần Quang Hai, the real-time x-ray image of biphonic singing (video print)*

nique, magnetic resonance imaging, yields precise, well contrasted images of organs but it cannot be used to examine a person's head if the patient has any metal in his mouth such as a dental bridge, since such a part is likely to be displaced by the magnetic field. None of these new technologies (with the exception of echography) allow for observation of movement in real time.

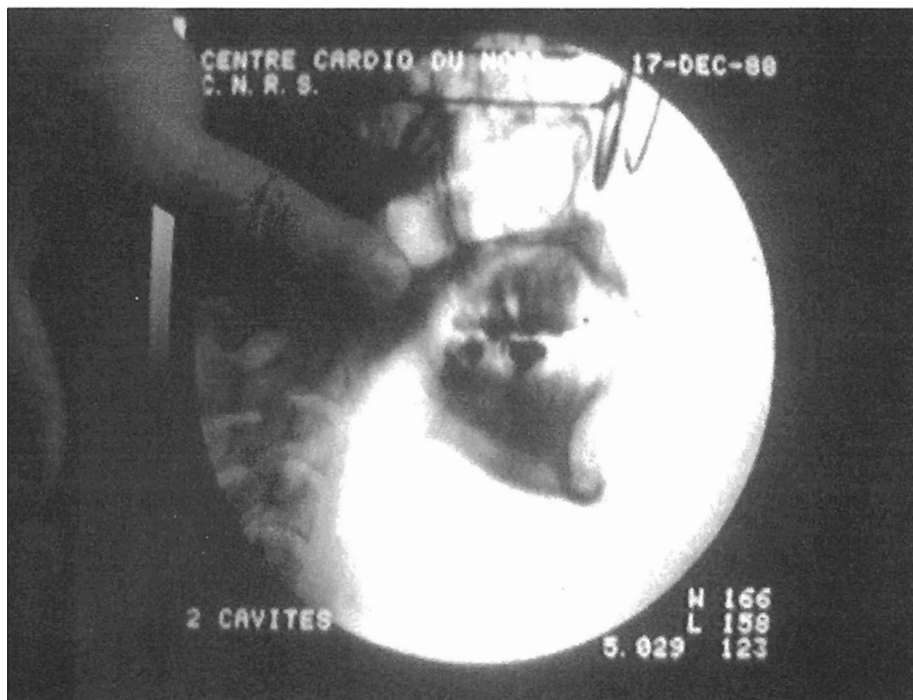
What remains is conventional radiography, with modern light amplification to reduce the length of X-ray exposure. We looked for a hospital equipped with radio-cinematography, and found a private cardiology clinic with a medical imaging department. The director of this department was enthusiastic about our research, especially when Trần Quang Hai demonstrated his vocal technique (which he was asked to repeat several times for the entire medical staff!). While Dr Besse, the department director, showed us his 35mm black and white

cinematography equipment and video recording on Umatic VTR, I watched another radiologist working with a computer screen displaying beautiful, clear color images of the heart and blood vessels. The time limit for direct computer recording, without passing through 35mm film or VTR, is 10 seconds. We made five 10-seconds takes: two recordings of two scales sung with the two main biphonic vocal techniques, and three successive takes to obtain the whole tune of a French folk song. All told, the X-ray recordings did not last longer than one minute, i.e. well within the safety limit inasmuch as physicians regularly record up to two minutes in cardiovascular examinations.

The X-ray equipment in a medical clinic is not designed for synchronized sound recording, so I had to anticipate the need to readjust the speed of the sound recording to fit the images filmed from the computer screen. For this purpose, I had Hai tap his mouth with his hand to make a sound that could be heard while the movement could be seen afterwards in X-ray images. Later, on the editing table, it appeared that the computer recorded in perfect sync with the quartz tape recorder, but the tapping, used like with a clapperboard, remained useful to synchronize the sound and image start-up time.

While I set up the camera in front of the computer to make a closeup of the screen, the radiologist programmed a loop with the first ten-second take, and looked for images with optimum legibility, changing from negative to positive black and white, to different color scales, and to contour analyses. These modifications and the explanations he gave at the same time to Hai were fascinating to look at and listen to. Although I had planned to shoot only closeups of each ten-second X-ray recording, I asked the physician to resume his manipulations and explanations when the camera was ready to film.

One encounters several difficulties in filming a computer screen or video monitor. Lack of synchronization between the screen scanning velocity and the cine or video camera speed causes horizontal lines to appear to move up or down, while vertical lines may move sideways, or a strong flickering may occur. The color balance does not correspond exactly to daylight or artificial light film stock. Low screen luminosity makes it necessary to film at the limit of under-exposure. If people are to be filmed simultaneously, the room lighting must be carefully adjusted. Even a professional cameraman experienced at filming computers requires many tests with different apertures and various lightings before being ready for final shooting. That would have been possible in a public research laboratory, but in a private clinic using its radiology equipment contin-



*The radiologist calls Trần Quang Hai's (and the viewers) attention to the characteristic features of the buccal and pharyngeal cavities (video print)*

uously during work hours, I did not want to ask the department director to devote a second Saturday to our project. Fortunately, the synchronizer indicated that the horizontal line moving up-and-down could be eliminated, and the spot light meter showed that the screen could be filmed with high-speed film stock and a fast lens. I took the risk of filming without tests. I was lucky I did, for if I had made tests to be developed in a laboratory before final shooting, this film would never have been made! When we finished shooting in the evening, we discussed ways to save the images stored on the hard disc (677 Mega Byte), which was completely full and had to be free the following Monday for cardiovascular examinations. The radiologist said that he would save it on a magnetic tape and the streamer was to be checked by a technician. When I called him back after having seen the rushes in the film laboratory, he was relieved to learn



*T. Ganbold, from the National Ensemble of the People's Republic of Mongolia, performs on stage (video print)*

the results were good, since all the data on his hard disc had been lost when he tried to download it! Thus the 16mm images I shot constitute the only record of our experiment. We would never have made a second X-ray shooting because we did not want to subject Hai to the danger of repeated radiation, even though the single exposure time was well within safety limits.

#### *Performers from Mongolia on Tour in Paris*

While the project was under consideration by the CNRS Social Sciences Directorate and the French Ministry of Culture, I heard that the National Ensemble of the People's Republic of Mongolia was slated to come to Paris. Hai and I immediately got in touch with the Mongolian Embassy in Paris to



*Trần Quang Hai (left) demonstrates his vocal technique for the two Mongolian performers in the dressing room of the theater (video print)*

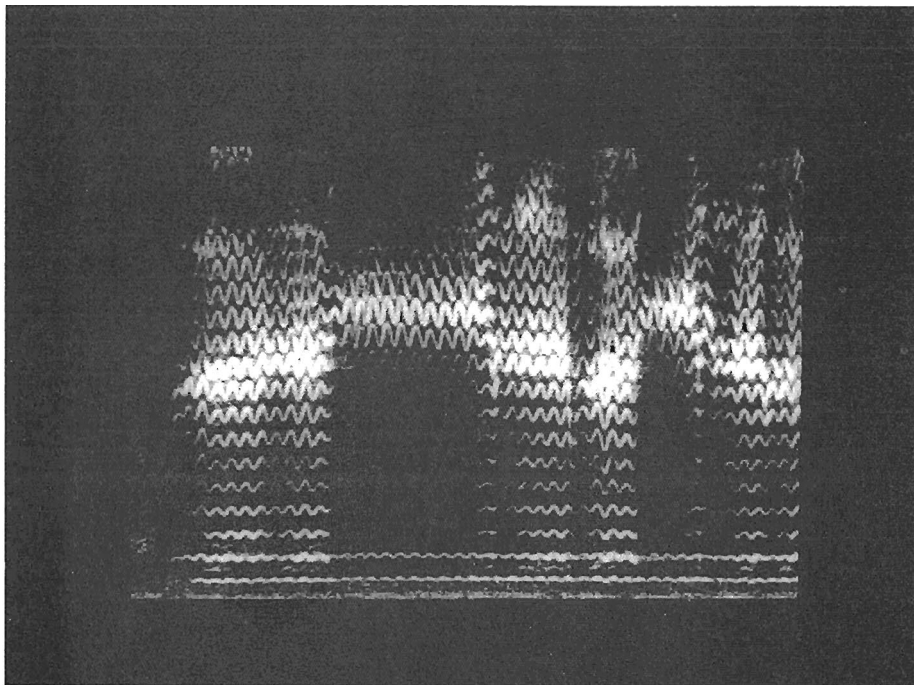
inform them about our project and request permission to film on stage and interview their biphonic singers. When the National Ensemble arrived for a two-week stay in Paris, we contacted the director and the accompanying official from the Mongolian Ministry of Foreign Affairs. They were rather reluctant, but they did accept our invitation to guide them and the two singers on a visit of the Ethnomusicology Department in the Musée de l'Homme and show them portions of my film "Head Voice, Chest Voice," which includes graphic animations of yodelling techniques. I hoped up to the last moment to film the two Mongolian Performers in our Ethnomusicology Department as they witnessed real-time digital signal processing of their voices and compared their technique with that of Trần Quang Hai. But unfortunately, the new DSP Sona-Graph our research group had ordered did not arrive until two weeks after their departure.

The theater seating arrangement did not make it possible to film closeups of the singers during an evening performance without considerably disturbing the spectators, who had, after all, paid for their tickets. We came to an agreement to film both the singing and the interviews during a two-hour session one afternoon, the only free time in the performers' busy schedule. In addition, one take was allowed from the rear of the theater during a public performance, to obtain a shot showing a singer entering and leaving the stage to a round of applause.

Besides filming the on-stage performance and interviewing two Mongolian singers about their techniques in the dressing room, I thought that I might have them listen to taped samples of biphonic singing from other parts of the world (Tibet, Rajasthan, South Africa, and the Harmonic Choir of the U.S.A.), to see how the Mongolians would react to variations in their art and garner their comments about them. Much to my disappointment however, they listened impassively and expressed no personal opinion about what they heard. No matter what explanation one might conjecture for this absence of any spontaneous reaction on their part – we did not know them well, we had to communicate through an interpreter who was a government official, the director of the National Ensemble was present, Mongolians are careful not to offend strangers by airing hasty negative judgments, etc. – the fact remains that their replies were trite, the interview was visually uneventful, in short this sequence afforded no material to edit into a film.

### *Spectral Analysis*

The DSP Sona-Graph has video outputs for horizontal and vertical synchronization, but the operating manual (issued in August 1988) does not mention them. Kay Electronics engineers I contacted reported in December 1988 that they had not yet determined how to use video outputs to record signals on a VTR or how to film the screen with a movie camera, and hence they had not been able to make a promotional film. If the scanning system of a computer does not allow for real-time synchronization with a movie camera, scientific filmmakers use frame-by-frame shooting which, with exposures longer than 1/50 second, eliminates the flickering and other image perturbations. Unlike other computers however, the DSP Sona-Graph does not permit a frame-by-frame analysis to be synchronized with a movie camera. A compromise was found by Christian Moncel, a scientific filmmaker from the CNRS Audiovisuel: when shooting with 6 frames/sec., the exposure time is four times longer (1/12



*Extract of a real-time spectrogram of biphonic singing by Sundui (photographed directly from the Sona-Graph monitor)*

second instead of  $1/50$  second) than with the normal speed of 24 or 25 frames/sec. Thus the flickering can be significantly reduced although not eliminated completely. This method required numerous manipulations. First of all, the speed of the sound recorder had to be slowed down fourfold (9.5 cm/sec. instead of 38 cm/sec.). Secondly, the Sona-Graph time display had to be made four times slower (32 seconds for a signal to scroll over the screen from the right to the left edge, to yield an 8-second scroll at the normal projection speed which we found optimal for our purpose). Thirdly, since the sound fell two octaves, the frequency range had to be lowered (From 4000 Hz to 1000 Hz).<sup>4</sup> Naturally, we verified that these manipulations did not modify the spectral analysis in comparison to the real-time Sona-Graph display.

To synchronize image and sound, it was necessary to mark the tape with blips before and after the sound recordings. These markers were visible on the

screen, so that after development of the film, the speed of the tape recorder could be adjusted while transferring the sound from the 6.5 mm tape to the 16 mm magnetic film. On the editing table, it was then possible to synchronize the image of the blip with the corresponding sound, and then to cut out the blips.

To avoid a monotonous succession of spectrograms, I devised brief dialogues between Trần Quang Hai and Jean Schwarz, the sound engineer in our research group. We also wrote a text commenting on the spectrograms shown in closeups. Since the filming speed was four times slower than in normal shooting, we first recorded the explanations on a tape recorder, then measured the duration of each phrase fragment and multiplied it by four, so that the corresponding hand movements pointing to the screen could be made four times slower and would look natural in the final film.

### *Musical Therapy*

The evening I filmed a Mongolian singer in performance, I met a musical therapist who was a former trainee in a workshop given by Trần Quang Hai. He agreed to be filmed as he delivered a university lecture about some successful uses of biphonic singing, and the theoretical and methodological issues related to it. The lecture was long, and no interaction occurred between the professor and the students. Clearly, film was not the ideal medium to capture the essence of this lecture; a written publication would do it more justice. Furthermore, students and teacher were seated on the floor in a circle, yielding images too similar to Hai's workshop. Therefore I did not include this sequence into the film.

### **First Editing**

There are two contradictory opinions about who should edit a film. One leading ethnographic filmmaker in France argues that the editor

must never participate in the filming ... he must only see and hear what has actually been recorded (whatever the intentions of the filmmaker might have been) (Rouch 1975:95).

On the other hand, an ethnomusicologist, trained by the National Film and Television School in England,

take(s) it for granted that the film maker in person will edit the film (Baily 1990:14).

All my previous films were cut by professional editors while I was sitting beside him or her at the editing table. But for this film, it happens that the CNRS Audiovisuel had recently been reorganized, and the editor job eliminated, and my budget did not allow me to hire an outside editor. Through my reading, analysis of other films, and work experience with the editors of my previous films, I was familiar with the rules and techniques of editing. At any rate, I frankly had no choice other than to cut the film myself with the help of an assistant editor.

Experience has taught me that when the editing seems finished after weeks of intensive labor, it is wise to let the film rest "in the can" for a while, get some distance from it, arrange screenings for various people, listen to their reactions and criticisms, and then go back and modify details or even the whole structure. Alterations have to be made before the final sound editing (dispatching the original sync sounds, commentary and added music onto various tracks), before the final negative cutting, sound mixing and transfer to optical sound. Editors who expect the work to last a certain number of weeks do not like to see this schedule upset, much less realize they have to start in again after they thought the job was done. In my case, I set aside from the outset two periods separated by several weeks to do the editing for this film.

At the start of the first period (4 weeks), four main sections had already been shot: the workshop, the Mongolian performers in concert and interviews with them, the X-ray images, and the Sona-Graph. So after synchronizing image and sound, my first editing task was to select shots and put together a rough cut of each section. The overall structure of four blocks of nearly equal length was boring. Yet I was reluctant to slice up the scenes like a sausage and distribute them throughout the film (in the manner of a standard TV documentary), since the internal logical and chronological development of main scenes would have been destroyed. Hai's explanations needed to be followed immediately by demonstrations of workshop trainees, and could be cut at most into two sequences corresponding to the two main vocal techniques. The X-ray images for each of these vocal techniques had to be kept as a complete sequence. For the spectrograms, viewers needed an introduction to grasp how the sound spectrum is displayed on the screen so that they could then compare different styles of biphonic singing.

Editing a documentary film is a long and slow process in which one progresses by trial and error. After editing three weeks and then a fourth week, the first two versions had the following structure: A workshop sequence on the one-

cavity technique; then X-ray images corresponding to the one-cavity technique; next the Mongolian performers, first a singer on stage, followed by interviews, and ending with a stage performance by the second singer; after that came the part of the workshop sequence devoted to the two-cavities technique; then X-ray images corresponding to the two-cavities technique; next the entire sequence of spectrograms; and finally the third sequence of the workshop where Hai recommends practicing while driving (the outdoor car scene had not yet been shot).

### *Screening and Initial Feedback*

When these early cuts were ready for projection, I showed them to colleagues and friends, music students in the acoustic class at the National Conservatory, and various adults and children with or without extensive musical knowledge. Their reactions and questions brought out the following problems:

Nobody (even not two professors of acoustics) could remember the difference between the two vocal techniques (one or two cavities) shown in X-ray cinematography, since the two sequences were too widely separated. Several non-musicians had failed to hear the harmonics in the first workshop sequence (indeed, workshop participants themselves often do not hear harmonics while producing them!). Such viewers did not grasp the subject of the film until much later.

A producer of scientific films criticized the use of a pointed finger on the X-ray images as an old-fashioned technique, and recommended frozen images and/or animated diagrams with voice-off narration instead. Aside from the fact that the high cost of frozen images or animation was not within the budget scope of this film, I did not agree with this criticism. Other filmmakers have subsequently upheld my opinion. The way the radiologist had explained the images to Hai was precisely to point his forefinger at the screen. That was more genuine and lively than animated diagrams ever could be, since it allowed the audience to witness our own first encounter with these images.<sup>5</sup> Since I liked these direct explanations, I also introduced some in the Sona-Graph sequence, where a thick forefinger was merely replaced by a white pencil, which is better for directing the viewer's attention towards the thin lines representing harmonics.

Several viewers told me that it took them time to realize that the spectrogram signal was in sound sync at the moment it appeared on the right edge of the

frame. Two filmmakers believed the camera panned on a still spectrogram! The solution was to make a medium shot between the first wide-angle shot showing the Sona-Graph from a distance, and the extreme closeups. In this intermediate shot, the spectrogram moving from right to left was shown with spatial references to the monitor, framed so as to leave its edges visible.

The first spectrogram in the initial version of the film showed two pitches an octave apart, sung in a natural voice. The sound engineer in our research group and I originally thought this was a good way to introduce spectral display to the audience. We were wrong. The equidistant lines of the harmonics had different spacings for the two fundamental pitches, for reasons that would have been too complicated to explain to the layman. Furthermore, as two acousticians pointed out, since the fundamental tones did not jump an octave in the following spectrograms, this introduction to spectral sound analysis of biphonic singing was more confusing than enlightening.

Another criticism concerned two spectrograms of the tune "Frère Jacques," first sung by Hai with the lyrics in natural voice and then performed in biphonic technique. The purpose was to let the viewer compare the differences in sound spectra, but that comparison turned out not to be easy. The first spectrogram displayed different configurations of harmonics because of the different vowel formants, and it had vanished before the second spectrogram appeared, so that the two were hard to compare visually. I remedied this problem by making a new sound recording of Hai singing the tune without words on the vowel *a*, which is rich in harmonics, and alternating between natural voice and diphonic voice. To make these corrections, it was necessary to film the whole Sona-Graph sequence again.

The criticism which struck me most, however, was that proffered by an ethnomusicologist colleague whom I expected to be enthusiastic but instead charged that the "tone" of the film was "too much didactic," i.e. boring. I owe him a debt of gratitude for this criticism, since it forced me to reconsider the film completely. I had clearly failed to communicate to the audience the enthusiasm I felt when I myself first saw the X-ray images and real time spectrograms when filming. I concluded that I had to revamp the structure of the film completely, and then proceeded to do so.

## Revising the Scenario, the Second Shooting and Editing Period

Better linkage between the main sections of the film was clearly required, and that meant shooting more footage. I was tired of wrestling with defective equipment (lights that short-circuited, zoom lenses that did not fit the camera), and frustrated by the need to shoot hurriedly because the equipment was needed elsewhere. Furthermore, the graduate student who made the sound recordings for the first shooting period had departed on a field trip to South America, and some of the planned new scenes required the skill of an experienced professional cameraman. For these reasons I asked the CNRS Audiovisuel for two technicians, a cameraman and a sound recordist, who did indeed provide optimal quality work for the final takes, thanks to their daily shooting experience and their perfectly maintained equipment.

To convey a sense of adventure in this visual exploration and to tell the story of the research, a first-person narrative by the filmmaker seemed preferable to impersonal commentary spoken by some anonymous voice. Normally, narrative is added to a film after it has been edited, despite the risk this method entails of detracting and distracting from the visuals.<sup>6</sup> In this case, however, I wrote the narrative text in conjunction with images I conceived for shooting, the idea being to avoid images likely to detract and distract from key textual passages. These images were intentionally banal, containing no important action, thereby offering the viewer a rest between attention-demanding major sequences (e.g. workshop, X-rays images, interview, spectrograms). Indeed, I had initially envisioned stationary framing, also taking into account that my French narrative would have to be subtitled in an English version. (Subtitles are known to be more difficult to read over moving images.)

The first new shots corresponding to the written narrative were made in the radiology department of the cardiology clinic. Besides fixed angle shots from a tripod, the cameraman tried a sequence-shot several times, walking around with the camera on his shoulder in the midst of the busy medical staff in the room. The subjective view a moving camera gives fitted the first-person narrative. The narrator-filmmaker walking into the radiology department thus conducted the viewer towards the next analytical sequence. I decided to present all the linking shots corresponding to a first-person narrative in this manner, distinguishing them stylistically from the more static shots of the four main scenes. (In the meantime I abandoned the idea of subtitling the French narrative in favor of replacing it with an English-language voice.)

The additional footage shot thus showed Hai walking across the street and into the theater where the workshop had in fact taken place several months earlier. Another shot involved entering the lobby of the theater where I had filmed the Mongolian singers five months before. To match up the decor with the original event, we naturally had to replace the theater posters, which by then were publicizing a different concert. Yet another mobile shot presented the interior of the sound laboratory in the Musée de l'Homme and a walk-up to the Sona-Graph. The whole spectrogram sequence had to be shot again anyway for the reasons explained above. In fact, owing to defects in the film stock, we ended up having to shoot it a third time, a hitch which actually gave us an opportunity to improve the framing each time.

The criticism and discussion after screening the provisional versions showed that the workshop sequence with French trainees was not a good way to start the film. To make sure from the outset that the viewer could recognize harmonics in biphonic singing, the film was better off beginning with a song performed by an experienced Mongolian artist. So to open the sound track I chose a recording taken from a series published by the Musée de l'Homme, which 15 years earlier had inspired Trần Quang Hai to learn this vocal technique. I decided to use images of Mongolian Altaï landscapes as a visual reminder of the origin of the technique and as a backdrop for an introductory rolling text, and to follow up with a closeup showing a Mongolian singer on stage so that an actual performance of biphonic singing would figure early in the film. Then one was ready for the film title.

To avoid any doubts as to the subject of the film, which after all is not about ethnography in Mongolia but rather ethnomusicological research in Paris, I selected a travelling shot, with the Eiffel Tower in the background, panning to the building housing the Musée de l'Homme, to accompany my narration about the beginning of this investigation. We made a dolly shot alongside the Trocadéro fountains, which spout water at different heights in what I deemed a visual simile to harmonics of different pitches. Some viewers may find this association far-fetched, but the main purpose of this shot was still to show the Eiffel Tower and offer a transition to the ensuing indoor shots in the Ethnomusicology Department, where one sees Hai transcribing and copying biphonic songs as the narration continues.

All this new shooting took place during the very period I was struggling at the editing table with a complete revision of the film's structure. The scenes should

not only follow one another in some logical, comprehensible order, but transitions should visually lead from one major scene to the next. When one changes the order of the scenes, one sometimes happens upon a visually attractive transition unforeseen during shooting. For example, the colorful lines of harmonics on the black monitor screen in the first Sona-Graph sequence are followed by outdoor neon lights announcing the name of the theater where the Mongolian performers were filmed. On the other hand, abrupt transitionless cuts can also prove successful especially when the following scene can be identified by the viewer because he has already seen the decor before. For example, after an X-ray image of Hai's profile at the end of the first radiology sequence, one jumps directly to a closeup of his face in the second workshop sequence. Similarly, the demonstration of vocal technique by one of the Mongolian performers at the end of the interview sequence is followed by a spectrogram of the same song, leading into the second Sona-Graph sequence.

A number of problems encountered in the final cutting of the film are worth mentioning here. For instance, in the interview the interpreter translated Hai's questions from French into Mongolian and the singers' answers back into French. Although at first I filmed the entire operation, I soon realized that translation in both directions took too long to be kept in the film, and that subtitles would speed up the pace. In one wide-angle shot placing Hai and the two Mongolian performers in the same frame, Hai sang a tune and asked their opinion about it. One of the performers responded by asking another question. While waiting for the translation, Hai looked at the interpreter, who was seated on the other side (out of frame), and then he answered in French, turning his head back only when the Mongolian singer spoke his opinion. Since all the images showing the interpreter were eliminated in the final cut, this glance away from the singer was incomprehensible. A filmmaker I consulted for advice suggested cutting out the whole shot. But it was important to show that it was not an ordinary interview situation of a journalist asking questions. In this case, the interviewer was himself a performer, and in fact the main protagonist of the film, and the interview roles were reversed. I solved the problem by finding in the rushes a closeup of Hai and post-synchronizing his answer (which had to be re-recorded to fit his lip movements better). Then I cut to a closeup showing the Mongolian performer listening, and finally back to the wide-angle shot. This solution was cumbersome and the sound mixing not very successful, but it was the only possible way to retain an important scene.

In my quest for a film title, I initially thought of "*Le chant harmonique*" ("Harmonic Singing"). The usual way to refer to this vocal technique in French is *chant diphonique* ("diphonic singing"),<sup>7</sup> and that seemed too narrowly technical for a film intended not only for ethnomusicologists and acousticians, but also the general public. To avoid confusion, I asked Hai to use the term "harmonic singing" in the workshop. But as several colleagues stressed afterwards, this too was not a good name since the French word can also mean "harmonious", and besides, all singing involves harmonics, no matter what voice technique is employed. I hesitated between two possible titles: "*La mélodie des harmoniques*" ("The Melody of Harmonics")<sup>8</sup> and "*Le chant des harmoniques*" ("The Song of Harmonics"), and finally chose the latter because of its metaphoric connotations. To replace the rejected French term *chant harmonique*, which figured twice in the final cut of the workshop sequences, with the generally accepted term *chant diphonique*, we re-recorded the sentences involved in the same room. The final sound mixing failed to hide a slight difference in voice timbre, however.

A third manipulation of sync sound for speaking voices was more successful. Since film time is not real time, many takes have to be drastically shortened to avoid monotony. (The ineluctable conflict between the filmmaker-ethnomusicologist who wants to keep the full length and content of his document and the editor whose job it is to make cuts, is no less dramatic when the two roles are played by one and the same person!) Some closeups and a medium shot in which Hai and the radiologists were seen from behind as they watched the computer screen were too long, yet part of their dialogue was vital for comprehension of the scene. The solution I found was to edit the sound of the original synchronous speaking to place it over the same computerized X-ray images repeated in a loop. Furthermore, since the computer images watched by Hai and the radiologist did not contain any sound, I mixed the direct sound of the radiologist's explanations with the original sound taped while Hai was singing the scales during the X-ray recording.

Another problem involved the tune "*A la claire fontaine*," which was chosen because I thought that French and many other Western ears would more quickly and readily recognize the relationship between pitches and tongue movements with this song than through some unfamiliar Mongolian tune. Since the computer could only record ten seconds of X-ray images in succession, Hai sang the tune in three fragments, with interruptions to check the image on the monitor located in an adjacent room. Owing to these interruptions and the

stressful obligation for Hai to record each fragment only once without changing his head position or exceeding the time limit, he failed to stay exactly on pitch. When the three fragments were edited together in sync sound, the change of pitch was so blatant that when a provisional version of the film was screened, some viewers did not recognize the tune. The humming of the X-ray machine fan in the background worsened the difficulties. From the point of view of science, postsynchronizing Hai's song was reprehensible, but the filmmaker must confess that that was his only recourse. I had either to respect the scientific veracity (but for what reason, if many viewers do not recognise that the tongue movements correspond to the melody of a well-known song?) or postsynchronize with a good sound recording of the whole tune sung with proper intonation. After long hesitation, and despite my scruples, I decided to yield to cinematographic exigencies. As Hai watched his X-ray images on a video monitor, we re-recorded an on-pitch version in the studio. Close scrutiny of his synchronized images made Hai very self-conscious about his tongue position, and after many tries he succeeded in making a postsynchronisation with minimal discrepancy. To relieve my conscience as an ethnomusicologist for having committed this distortion of truth, I later restored the original sync sound editing on a videocassette and deposited it in the archives at the Musée de l'Homme, where the footage can be examined for research.

At that stage in the editing work, I still had the idea of including something about biphonic singing used in musical therapy. I asked the musical therapist if I could film an individual therapy session. A young woman, who was herself preparing to become a musical therapist, agreed to be filmed. Since a session could last between one and two hours, it was not possible, for financial and technical reasons, to shoot in 16mm. (Filmstock and development are costly, and the magazine has to be changed every 10 minutes.) Instead we used a Betacam on the assumption that the most interesting excerpts could later be transposed from video to 16mm film. During the actual filming, I understood that short passages would not do justice to the process of musical therapy (which entails many sessions over months or even years), and long sequences would completely distort the balance with respect to other scenes in the film.

Nevertheless, musical therapy and other recent applications of biphonic singing in the West (contemporary music, meditative music, alternative medicine, phoniatriy) were worth mentioning. The solution I came up with was a text rolling over images of Paris at the end of the film, as a counterpart to the introductory text rolling over a Mongolian landscape.

After showing the string of spectrograms, I wanted to exploit the entertainment value of a scene of trainees practicing biphonic as they drove their cars. I also thought of addressing the audience briefly, just a sort of wink. So in a shot showing a short conversation between Hai and me in his car, I had myself say that now that I had reached the end of the film, I too wanted to learn biphonic singing. Turning towards the camera, I questioned the viewers "How about you?" Besides creating an effect of humor and surprise, this shot finally allows the audience to discover the face of the first-person narrator who had spoken as a disembodied voice throughout the film.

Instead of then showing a Paris traffic jam from the top of a building, as the initial project called for, I thought of a way to visually communicate the idea that biphonic singing could enable Hai and me to escape from the congestion. Several years ago I saw Yves Yersin's fiction film "*Les petites fugues*" about a farmhand who, after spending his whole life working on a farm, acquires a moped and goes off to discover the outside world. In a wonderful traveling shot, one watches through the eyes of the farmhand riding on his bike as the scenery passes by and then takes off and flies high over the countryside. A shot of this kind, obviously made from a helicopter, was of course impossible in Paris traffic. Daniel Cavillon, the cameraman to whom I spoke about my *idée fixe*, suggested simulating a take-off by using a camera crane fixed on a truck, and then cross-fading to a shot taken from a helicopter in flight at a greater height. I convinced the director of the CNRS Audiovisuel to provide the extra funds required to shot this scene, designed to give a breath of fresh air after all the indoor shots. It would, I argued, contribute a poetic and humorous finale to the film. Since the helicopter pad in Paris is located next to the highway ringing the city, we filmed the crane movement on the thoroughfare, thinking that we could then cross-fade to the helicopter in take-off. Tight air safety regulations, however, stipulate that a helicopter must take off from the airstrip and reach an altitude of 400 m before overflying the highway. Hence there was a huge gap between the 4 meters of maximum height reached by a camera crane on a flat-bed truck, and the 400 meters minimum altitude required for a genuine helicopter flight. The solution was to film from the roof of a nearby hotel using a pan-and-tilt shot. The three shots were linked in cross-fading to show Paris from the ring road. That was a less-than-perfect substitute for the one continuous smooth take-off shot which I would have liked to have made from the Champs-Élysées. What is actually possible in filmmaking is often different from what the filmmaker has in mind!

When I described this final scene to my wife, she mused fancifully that it would be nice to continue the flight from Paris all the way to the Altaï mountains! I liked the idea. In the revised scenario, the film started with Mongolian landscapes; ending with other images of the Altaï would tie together the film's structure. This closing would also constitute a symbolic return to the vocal technique's home in Central Asia, which is appropriate because it was taken away for analysis in Paris and now was being brought back to its place of origin. Although it was not feasible to film the odyssey in reality, the journey could be suggested cinematographically by an image cross-fade between the aerial view of Paris and a landscape of the Altaï mountains, accompanied on the sound track by a cross-fade between Trần Quang Hai's composition in the style of Western contemporary music and a recording of traditional biphonic singing from the Altaï.

I still had to locate footage to open and close the film. In the film libraries in France, I was unable to procure aerial views of the Altaï mountains. But I did manage to obtain slides that could be filmed so as to simulate movement. The final film hence begins with a zoomed pan-and-tilt shot over a Mongolian landscape to simulate a climb into the mountains on a track and get the audience entered in the film. It ends with a zoomed pan-and-tilt shot of a landscape in southern Siberia, in an area inhabited by Tuva people, which is a follow up to the helicopter travelling shot. This landscape sets the backdrop for a rolling text which, following after the statements about recent Western applications of biphonic singing, provides a review of its social context in Central Asia. The image of a Tuva landscape induced me to introduce sound recordings of Tuva biphonic singing, even though I did not plan that in the first scenario, to add them to the other Sona-Graph analyses (which had to be filmed again anyway) and to dub them into the final images. The very last frame of the film shows a stone cairn in the foreground. It is a shrine dedicated to mountain spirits, but the film does not explain that. Experts in the ethnography of the region, however, will spot the relation of this image to the earlier text explaining that, according to the traditions of nomadic herdsman and hunters in the Altaï mountains, biphonic singing is linked to the forces of nature and that it glorifies the Master of the Mountain.

The finished film is substantially longer (38 minutes) than the initial project (25 minutes), because of the extra unexpected sequence with the Mongolian singers and the numerous linking shots added to tie together the main sections. The final product also proved substantially more expensive than planned,

because the budget had to cover the camera crane and helicopter shots, the renewed shooting of the Sona-Graph sequence, and subtitling even of the French version.

## English Version

Making an English version of the film caused more problems than I expected. As for my previous films, I preferred subtitling in order to respect the voices of the people on screen rather than introduce a translation of their words in a voice-over (the usual TV interview technique). Subtitling, however, was a problem during the radiologist's explanations of the X-ray images that were shown closeup, and in the comments that the engineer and Hai made about the Sona-Graph display. No viewer could have followed the pointing fingers, scrutinized the X-ray images and spectrograms and read at the same time English subtitles. In these two cases I finally chose an English voice-over, spoken by the interpreter who had translated the texts.

My first-person narration also created a problem for the English version. What is the use of subtitling a voice-off or making an English voice-over?<sup>9</sup> Replacing my voice by some English native speaker had the drawback of depersonalizing my narration and obscuring the fact that the person conversing with Hai in the car at the end of the film was the narrator-filmmaker, who appears on screen for the first time in that frame. For these reasons, I decided to recite the commentary in English myself despite my strong foreign accent.

As a result, the English version of the film uses translation in a total of four different modes: rolling texts, subtitles of dialogues and captions indicating names and places, voice-over by a native American, and a voice-off narrated in English by me.

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In what category should this film be classified? The CNRS Audiovisuel distinguishes between films for "experts," "informed audiences" and the "general viewing public." Other classification systems commonly used by visual anthropologists include rubrics such as "research footage" or "research document," "archival footage," "educational film," "conventional (scripted) documentary," "direct" or "observational cinema" (called formerly "*cinéma vérité*"), "trave-

logue", and "TV report." John Baily proposes three uses of motion pictures in ethnomusicology: "Pure research," "Demonstration/teaching," "Making audio-visual 'texts'" (Baily 1989a).

My film may be considered with respect to each of Baily's use categories. It contains research documents such as X-ray images, spectrograms, an exhibit of how workshop members start to learn biphonic singing, and performance by Mongolian singers. Yet by the standards of the Institut für den Wissenschaftlichen Film (IWF) in Göttingen, as attested by one of its representatives, "The Song of Harmonics" would not be a "scientific film."<sup>10</sup> After all, it has scripted and acted scenes (in the workshop, Sona-Graph and car sequences), it does not respect the chronological order of shooting, and it contains pure fiction (the final take-off and overflight of Paris en route to the mountains of Central Asia, achieved with the help of music composed especially for this film).

Is it then an educational film? Again, I reacted strongly when a colleague called an early version "very didactic," since this expression has become synonymous with "boring." It is true that most so-called educational films I have seen are not particularly entertaining or humorous, but there is no reason why education should always be dry and boring. I definitely would not be happy to see my film put in the category of conventional educational films. Yet certainly, it could be used in universities or conservatories to teach acoustics, ethnomusicology, or voice technique, and it may serve as well for music education in secondary schools.

As for Baily's third category of films in ethnomusicology, "Making audio-visual 'texts'," all ten characteristics of the documentary style of the National Film and Television School (NFTS) in the United Kingdom given by Baily, do apply to parts of my film.<sup>11</sup> But on the whole, I do not consider it an "observational film" according to the NFTS film standards, for some of the very reasons that also exclude it from being a "scientific film" according to the IWF criteria.

"The Song of Harmonics" hence is an admixture of different cinematographic styles and approaches. It contains elements of "Pure research," "Demonstration/teaching," "Making audio-visual 'texts'," and even "Fiction" all at once. This work illustrates my continuing conviction that a film on music made by an ethnomusicologist can and should appeal to various audiences that see different things in it, depending on their particular interests, backgrounds and knowledge.<sup>12</sup>

## Notes

- <sup>1</sup> Cf., for instance, several contributions in Rollwagen 1988.
- <sup>2</sup> Following the film's premiere at the 1989 ICTM Conference in Schladming, Austria, the term "biphonic singing" was critized by an ethnomusicologist, who argued that there was only one sound and that a better term would be "overtone singing." Another viewer answered to that by asserting: "There is one sound in emission, and two sounds in perception!" The original version of the film was in French, and the French language has no equivalent term for "overtones" as distinguished from "harmonics." Furthermore, the expression "overtone singing" does not convey the idea that the fundamental pitch is heard distinctly. Natural trumpets or flutes play tunes with overtones without a drone of the fundamental pitch. In discussing terminology, Léothaud (1989:18) prefers the French term *diphonique* to *biphonique*, which joins Latin and Greek roots. Nevertheless, for the English version of the film, I have maintained the term "biphonic" because it is more commonly used than "diphonic."
- <sup>3</sup> In his book on "Ethnographic Film," Karl Heider discusses at some length distortions of behavior, including "staging:" "Casual critics of ethnographic films often condemn a film on the grounds that some scenes are 'staged.' By this they seem to imply that the behavior is not accurate because it was directed by the filmmaker. ... There are two related questions: if the events in a film were not purely spontaneous, then what was the role of the filmmaker? And if the events were in some manner instigated or encouraged by the filmmaker, were they events in the current cultural repertory or were they revived after more or less long abeyance? Although these facts should be part of the public record of any film with scientific pretensions, they can only be established for a few ethnographic films..." (Heider 1976:56).
- <sup>4</sup> A range up to 4000 Hz appeared to be sufficient to visualize the melodic lines of the harmonics. Some spectrograms in a higher range show interesting configurations of harmonics (not distinctly perceived by the ear as melodic lines), but any change of scale in the frequency analysis would have been confusing in this film since the spectrograms are present in real time and are seen only once by the audience. Such phenomena can be studied directly using the Sona-Graph. Many spectrographic analyses of biphonic singing have been published by various authors (cf. Bibliography in Léothaud 1989). At the 1989 ICTM conference, Franz Födermayr and Werner Deutsch presented other analyses made with a different computer system. Unfortunately, the presentation schedule was shifted, and Hai and I (together with many other participants at the conference) missed this event. At any rate, the aim of this paper is not to provide a study guide of this film for research and teaching about biphonic singing or to offer detailed analyses of spectrograms, but rather to discuss the process of filmmaking.
- <sup>5</sup> In 1974 a physician made an X-ray video recording of Trần Quang Hai, who at that time was starting to learn biphonic singing. That recording, made on black-and-white Sony video tape, can no longer be viewed because the machine used to record this document is no longer functioning and the tape cannot be read by another VTR of the same model. A published report provides a brief discussion of three hand-drawn figures traced from frozen video images (Borel-Maisonny & Castellengo 1976:13-15). The acoustician Michèle Castellengo concluded (I translate from French): "Cine-radiographic imaging is a powerful research tool which has great value to study singing and playing of certain instruments. Even a short sequence (kept brief for obvious physiological reasons) yields a great deal of information that one becomes aware of only gradually after viewing and listening to the document repeatedly. Any image is complex and difficult for non-specialists to decipher. There are many important points, including the lips, tongue, soft palate and larynx, and one cannot observe them all simultaneously ..." (15). Since that statement was made, technology has progressed, especially with respect to computerized image processing. In a loop one can now examine the several important points in succession, and images can now be enhanced by inverting them from negative to positive, by selecting a color scale, and making a contour analysis.
- <sup>6</sup> Karl Heider (1976:70) has pointed out that "it is almost impossible to have a narration which does not detract and distract from the visuals."
- <sup>7</sup> The French term *chant harmonique* has sometimes been used (for example, Belfer 1988), while in English "Harmonic Choir" is the name which has been given to a well-known vocal group directed by David Hykes.
- <sup>8</sup> As I learned later on, the expression *mélodie d'harmoniques* is actually used by Léothaud (1989:22).
- <sup>9</sup> Following the *Dictionnaire de l'Audio-Visuel* (Pessis-Pasternak 1976), I make a distinction that is not always made by professional filmmakers, between a "voice-over," i.e. a spoken translation of dialogue over an initial sound whose volume has been lowered, and a "voice-off," i.e. a commentary by a narrator who does not appear in the field of image.

- <sup>10</sup> According to Fuchs (1988:222), "a scientific ethnographic film documentation must satisfy the following requirements: unity of place, time, group, and action, together with strict obedience to the chronology of the action in the final version of the film. Artificial manipulation in either shooting or cutting is not permitted. A scientific film also rules out the use of staged scenes. ... it is not permissible in a scientific ethnographic film to present particularly impressive scenes at the very beginning, a practice common in television films." Regarding the chronological order of time, many ethnographic filmmakers are of the opposite opinion (cf. Baily's "7th heading" as discussed below in Note 11).
- <sup>11</sup> Baily's (1989a:8-12) characterizations of the NFTS film style, italicized hereafter, may be defined briefly by a few quotations. In parentheses, I indicate the scenes in my film which correspond to these headings. "1. *Narrative Form*: ... documentary film narrative may be in the nature of a sense of gradual discovery, of revelation, of getting deeper into things" (My whole film is constructed according to this principle); "2. *Portrait Film*: ... The portrait film follows the same person in many different situations, allows the audience to build up an acquaintanceship... and creates an empathy" (Trần Quang Hai as a musician and researcher); "3. *Not Scripted - Film as a Mode of Inquiry*: ... a great deal of flexibility is essential so that one can deal with the unexpected" (The sequence where the radiologist gets to see the X-ray images for the first time at the same time that Hai and I do); "4. *Access and Participant Observation*: ... the 'short crew' which causes minimal physical disruption of the actuality being recorded" (Workshop); "5. *Reflexion on the Filmmaking Process*: ... characterized by the presence of the film-maker ..." (In the shot in the car) and "... the use of first person narration"; "6. *Sequence Shooting*: ... long continuous shots" (The average length of my shots is longer than in conventional film language); "7. *Reordering of Time*: ... This moving around in time is anathema to those who think that film should be used simply to make an 'ethnographic record' and differentiates the documentary film from 'pure research footage'. In response the ethnographic filmmaker points out that in writing anthropology we are not obliged to move in the order in which the data were collected"; "8. *Use of Voice-Over Commentary*: ... One should avoid a kind of authoritarian ethos where an impersonal but authoritative voice tells the audiences what is really happening ... If narration has to be employed it is best to use the voice of the film maker, speaking in the first person, as a participant of the action presented;" "9. *Search for Native Explanations and Conversations*" (In the workshop scenes and the interview with the Mongolian singers); "10. *Subtitling*: ... It allowed the people to speak for themselves, a radical change of approach and of power relations."
- <sup>12</sup> Just as this paper was being prepared for publication, I read a report on a round table discussion on visual anthropology, in which the renowned ethnographic filmmaker David MacDougall expressed the same opinion about audiences: "Do you believe it's possible for a film to be a different film for different audiences, but still be effective for different audiences? I think I've had the experience of a film being of interest, certainly to anthropologists, on one level, but if you show it to a more general audience, or to the people in the film, they're seeing a quite different film. And yet, if the film is well enough made, or if it has a rich enough content, then possibly it can be an effective film for all those of these groups" (MacDougall 1989:21).

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- 1979 *'Are'are Music*. 16 mm (and videocassette), 150 Min.  
1987 *Yootzing and Yodelling*. 16 mm (and videocassette), 50 Min.  
1987 *Head Voice, Chest Voice*. 16 mm (and videocassette), 23 Min.  
1989 *The Song of Harmonics*. 16 mm (and videocassette), 38 Min.

## Acknowledgements

For substantial revision of the English text I am grateful to James Rosenstein, Malcolm Gain and particularly to Théodore Schuker.

Hugo Zemp

## **Eine Stimmtechnik filmen: Die Realisierung von „The Song of Harmonics“ (Kurzfassung)**

Während die kinematographischen und videographischen Mittel mehr und mehr für die ethnomusikologische Forschung und die Verbreitung der Forschungsergebnisse eingesetzt werden, sind bis jetzt nur wenige methodologische Studien veröffentlicht worden. Dieser Artikel bespricht die konzeptuellen und technischen Probleme beim Realisieren eines Filmes über diphonisches Singen (auch Obertonsingen genannt). Bei dieser vor allem von Zentralasien her bekannten Stimmtechnik singt eine Person zweistimmig: Sie singt einen durch den Grundton gebildeten Bordun und darüber zugleich eine Melodie aus Obertönen, die in der Mundhöhle verstärkt werden.

Der Autor wollte das Funktionieren dieser Stimmtechnik sowohl vom physiologischen als auch vom akustischen Standpunkt aus visualisieren. Er wollte Sänger beim Singen und ihre Aussagen über das Singen filmen und Grundinformationen vermitteln, ohne den Film mit unterlegten Sprachkommentaren zu überladen. Folgende Mittel wurden verwendet: Radio-Kinematographie unter Bearbeitung der Bilder mittels eines Computers; Aufnahmen des Monitors eines neuen Modells des Sonographen mit Realzeit-Analyse des Tonspektrums; Drehen eines Einführungskurses, in dem Trần Quang Hai, Mu-

siker und Ethnomusikologe vietnamesischen Ursprungs, diese Stimmtechnik lehrt; Aufnahmen eines Konzerts mit mongolischen Sängern auf Tournee und eines Interviews.

Ein provisorischer Schnitt wurde mehrfach einem unterschiedlichen Publikum gezeigt. Kritiken und Reaktionen haben den Autor dazu bewogen, nicht nur zahlreiche Einzelheiten, sondern die Gesamtstruktur des Filmes zu revidieren und neue Szenen zu drehen. Um die von vielen didaktischen Filmen verursachte Langeweile zu verhindern, wurde der Film nach einer Narrativ-Struktur gebaut, die versucht, den Zuschauer das Abenteuer dieser in Paris ausgeführten visuellen Forschung miterleben zu lassen. Das Resultat ist eine Mischung von Stilen und Annäherungen: Es enthält unveröffentlichte Forschungsdokumente, Sequenzen im Sinne eines Observations-Cinema und sogar Elemente von Fiktion. Das Ziel war es, sowohl spezialisierte Forscher, Universitätsstudenten und Schüler der Musikklassen zu interessieren, als auch ein breiteres Publikum anzusprechen. Zu diesem Zwecke wurden analytische Bilder mit instruktiven und unterhaltenden Szenen kombiniert – zur Befriedigung des Intellekts und zum Vergnügen von Auge und Ohr.

Hugo Zemp

## **Filmer une technique vocale: la réalisation de «Le chant des harmoniques» (résumé)**

Bien que les outils cinématographiques et vidéographiques soient de plus en plus utilisés pour la recherche et la diffusion des résultats de la recherche en ethnomusicologie, peu d'études méthodologiques ont été publiées jusqu'à présent. Cet article aborde, par le biais de la de-

scription d'une expérience récente, les problèmes conceptuels et techniques rencontrés lors de la réalisation d'un film sur le chant diphonique. Dans cette technique vocale, pratiquée originellement surtout en Asie centrale, une seule personne chante à deux voix: un bourdon cons-

titué par le son fondamental, et une mélodie superposée formée par des harmoniques renforcées dans la cavité buccale.

L'auteur souhaitait visualiser le fonctionnement de cette technique vocale aussi bien du point de vue physiologique que du point de vue acoustique, donner des informations de base sans surcharger le film de commentaires en *voix-off*, filmer des chanteurs sur scène et recueillir leurs témoignages. Les moyens mis en œuvre étaient les suivants: radio-cinématographie avec traitement informatique de l'image; prises de vue du moniteur d'un nouveau modèle de Sona-Graph permettant l'analyse spectrale en temps réel et son synchrone; filmage d'un atelier d'initiation où Trần Quang Hai, musicien et ethnomusicologue d'origine vietnamienne, enseigne cette technique vocale à des stagiaires; prises de vue d'un concert de chanteurs mongols en tournée et d'une interview.

Un montage provisoire du film a été présenté à plusieurs reprises à des publics variés. Les critiques et les réactions ont amené l'auteur à réviser non seulement de nombreux points de détail, mais la structure entière du film, et à tourner de nouvelles séquences. Pour éviter l'ennui généré par de nombreux films didactiques, ce film a été construit selon une structure narrative amenant le spectateur à revivre l'aventure de cette recherche visuelle effectuée à Paris. Il en résulte un mélange de styles et d'approches cinématographiques: documents de recherche inédits, séquences de cinéma observationnel, et même des éléments de fiction. Le but était d'intéresser aussi bien les chercheurs spécialisés, les étudiants universitaires et les élèves de classes musicales que le grand public, en combinant des images analytiques avec des séquences instructives et divertissantes, pour la satisfaction de l'intellect comme pour le plaisir des yeux et des oreilles.