

Listening to the Eiffel Tower



by **China Blue**

**Location:**

Tour Eiffel, Paris France

Recording Dates:

September 26-28, 2007

September 26th

Recording Period: 10:00am – 3:00pm

Temperature: 50 – 51 deg.

Wind speed: 4.1-9.3 m/s

Wind direction: N & NNW

Visibility: 6.2 mi.

Events: Partly Cloudy, 1:30-2:00 light rain

September 28th

Recording Period: 10:30am – 12:00pm

Temperature: 53 – 57 deg.

Wind speed: 4.6 – 6.2 m/s

Wind direction: NW & NNW

Visibility: 4.3-5.0 mi.

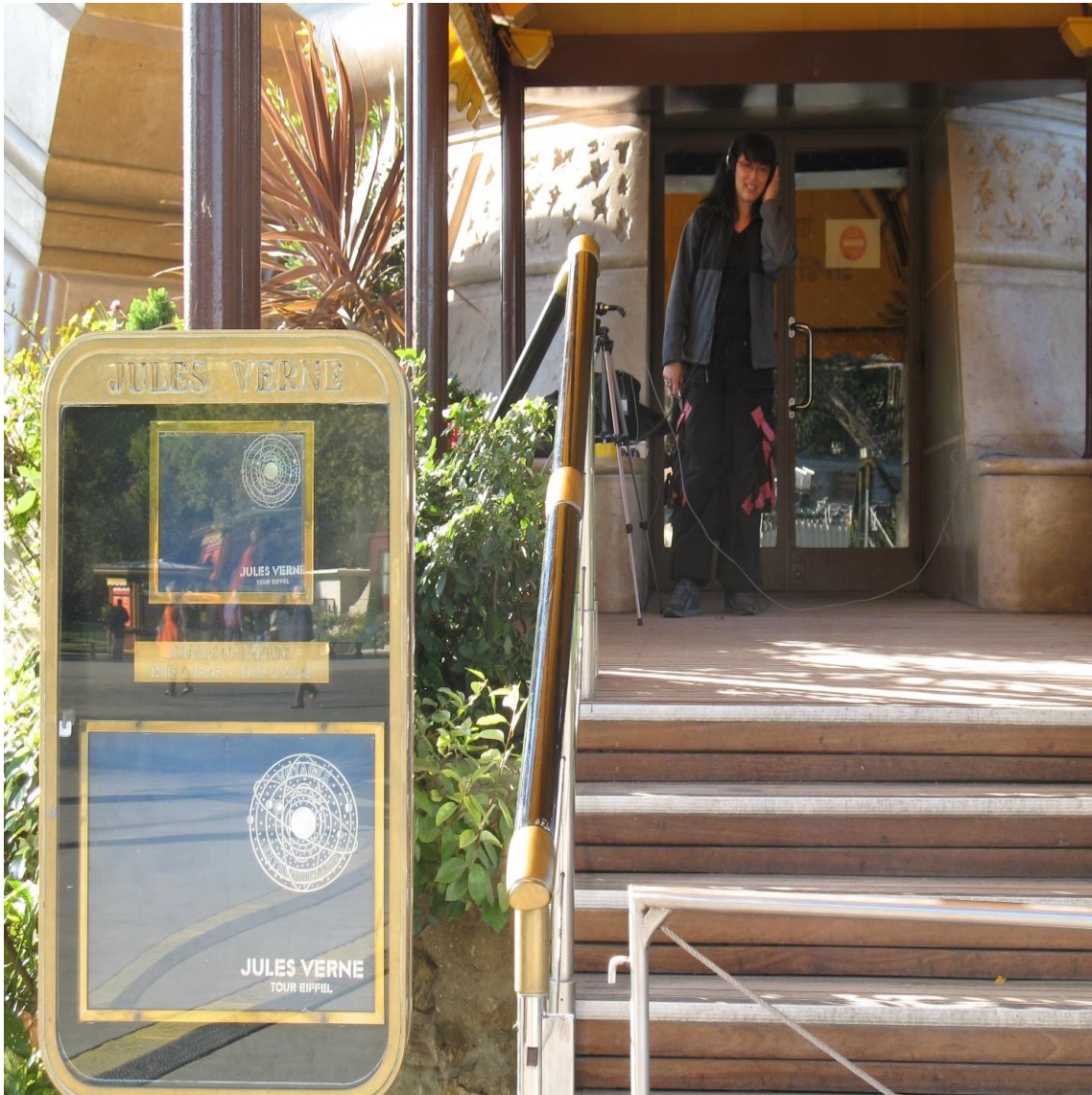
Events: Light rain



I am artist who works with sound. In 2006 when I was wondering along the left bank of Paris I had the random thought that it would be interesting to make a sound piece based on the acoustics of La Tour Eiffel. A year later, I became the first person to record the Eiffel Tower.

The organization in charge of running the Tower gave me access to the monument to document it's ambient acoustics and vibrations - the intrinsic sounds of 7300 tons of 2,500,000 rivets and 18,038 pieces of steel moving in the wind and in response to environmental changes, as well as the sonic environment of the 30,000 people who visit it daily as they move from the ground to the pinnacle. With the enormous help of the onsite consultant and Chief Technical Officer, Seth Horowitz, PhD., who headed the technical team, we succeeded in not only recorded from the publicly accessible regions, but our guide, Olivier Picard, took us to the machine room, home of the enormous 100 year old gears and motors that carry the visitors up and down the tower and the security stairwell just under the top level from which we found sound and vibrations from the elevators and the wind against the structure.

The scientific technology used to record the structure was a combination of in-ear binaural microphones and custom designed seismic microphones. The recordings that we captured are indeed fascinating as they represent both the physical nature of the structure as well as the human experience. With these resources I have been able to document the sound of the wind against the surfaces of the steel, the intermittent rumbles as the elevators moved up and down as well as the vibrations from people walking. With the binaural in-ear microphones I captured the ambient soundscape



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The first location we recorded was here on the ground level in front of the Jules Verne Restaurant.

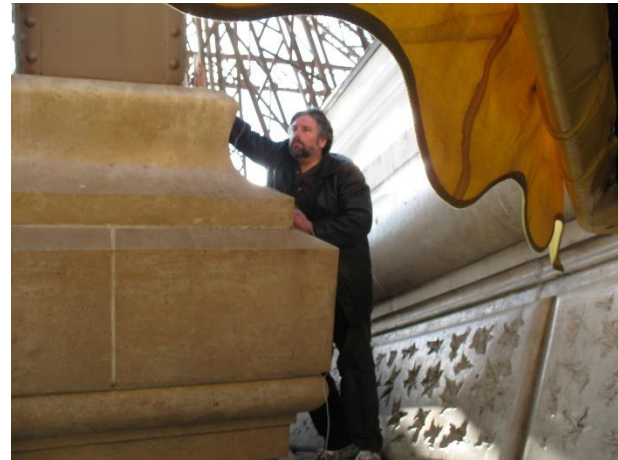


Dr. Seth Horowitz the Chief Technical Officer, is seen here setting up the equipment.

Equipment

We brought two pieces of every piece of equipment we could think of just to make sure we were well prepared.





Seth duct taped equipment to the tower while happily ignoring the no climbing sign.

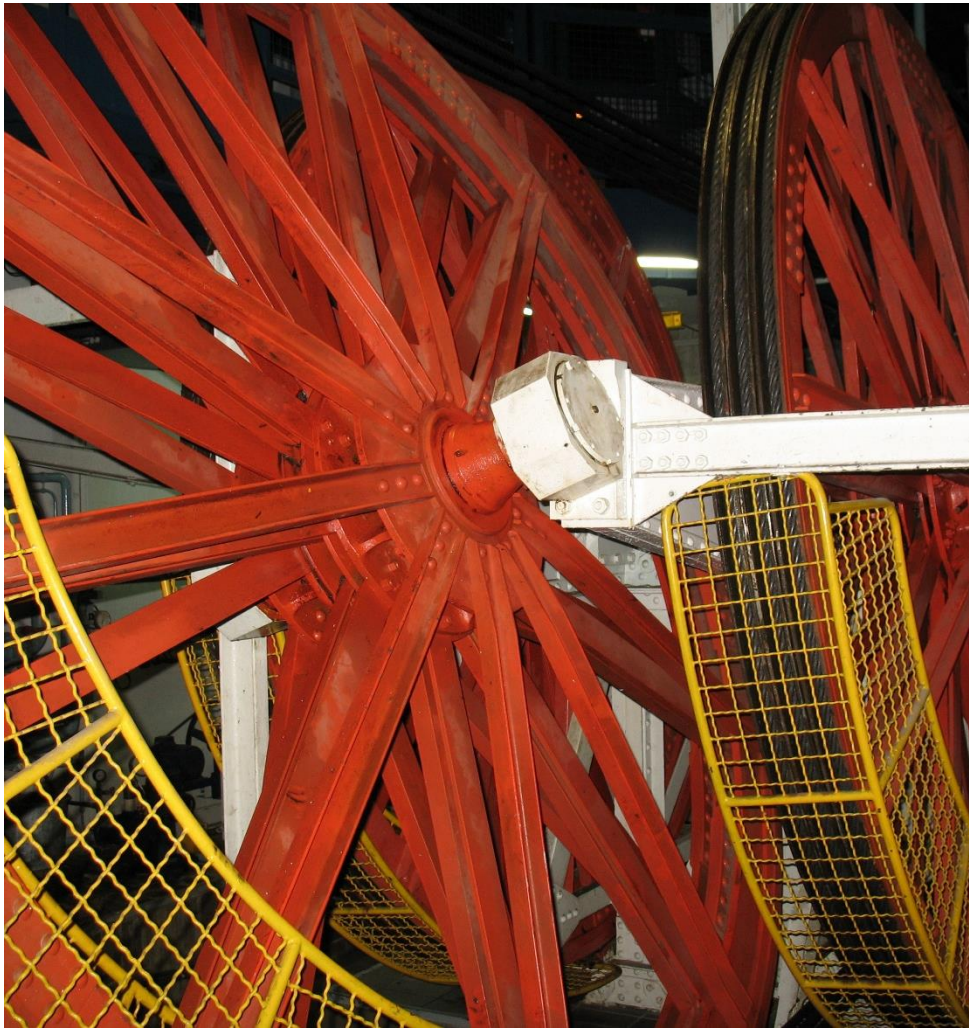
Moments later the machine gun armed security guards discovered his renegade behavior and demanded him to stop, not knowing that he was permitted to work on the monument. Although Seth was rattled to be confronted by them, he later relished telling the story.



The Machine Room

This area was inaccessible to tourists as a result we had a unique opportunity to see and work in it.





An exciting moment occurred in the machine room when one of the elevators briefly broke down. That was when we heard the machinists swearing because it interrupted their coffee break, while they scrambled to fix it. Seth claimed I broke La Tour Eiffel!





I did indeed think of bringing a soldering gun. But I was suspicious that I would not get it past airport security. While I hoped that my inability to ask where to find one in Paris would not be necessary unfortunately our worst case scenario happened when one of the leads to a monitor broke. I stared at the problem for a long time while Seth's loud chewing of his peppermint gum kept interrupting my concentration. I then turned to him and asked him for his wet wad. With confusion writ large across his face he relinquished it to me. I applied it to the sensor and when it dried it worked! Lesson learned, when the soldering job fails, use chewing gum!



ON THE PEAK!



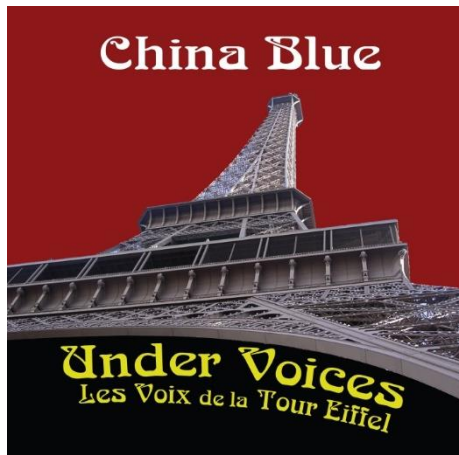
Here we heard the squeals of Irish school children shrieking over and over again “holy crum, holy crum the Eiffel Tower!”



View of the Champs de Mars



View of the Champs de Mars



The works in **Under Voices** are based on the unseen and usually ignored aspects of the structure, yet these are what form its living energy: Here are the voices of the Eiffel Tower.

Under Voices (5:58) The autumn wind in full force at the tower's summit is a powerful experience, requiring strength to stand up against it as it blows through the iron beams. Yet while, you can feel it and hear a high pitched whistling, most of the wind's energy is spent sending shock waves and vibrations through the tower's structure, largely unnoticed, but very much there. Under Voices is the unheard song of the tower in the wind.

Crypto Keys (3:10) The Eiffel Tower is not just a tourist attraction. It has been involved in communication and counterespionage in two world wars because it is one of the tallest radio towers in the world. This piece is based on DMTF tones encoding information about the tower as well as busts of encrypted shortwave communications of multinational origin, creating a collage of acoustic cryptology.

The Wind and the Accordionist (2:38) Edith Piaf is a historical icon of French music. Her voice in combination with the tones of the accordion evoke a traditional vision of Paris. This piece weaves samples of her classic songs with the sounds of the wind through the tower to create a sonic mosaic of culture, architecture and nostalgia.

Memory Strains (4:08) The elevators are the vessels that have carried people up and down the tower's living body for over a century and the operators are their guardians. These people have heard snatches of millions of lives in a multitude of languages for over a hundred years. Memory Strains pays homage to these lives with acoustic fragments that flicker by creating a vertical flow of sound.

Credits

Chief Technical Officer, photographer and sound design: Seth S. Horowitz, PhD, Co-Founder of NeuroPop

Creative Director: Lance Massey, Co-Founder of NeuroPop and composer of the T-Mobile ring tone.

Technical Team: France Languérand, Cyril Lecomte, Matthieu André, Sylvan Daval, Stephanie Jeanjean, Tony Regazzoni, Florian Sumi, Paul Welsh

Consultant: Simmons Multisensory Laboratories, Brown University, Providence, RI USA

Movies

UnderVoices: <http://www.youtube.com/watch?v=buuvD6T7MWU>

The autumn wind in full force at the tower's summit is a powerful experience, requiring strength to stand up again it as it blows through the iron beams. Yet while you can feel it and hear a high pitched whistling, most of the wind's energy is spent sending shock waves and vibrations through the tower's structure, largely unnoticed, but very much there. Under Voices is the unheard song of the tower in the wind.

Memory Strains: <http://www.youtube.com/watch?v=yEs8IrIBvT4>

"Memory Strains" is created from the viewpoint of the elevators of Eiffel Tower and created from original sound recordings made from this famous Parisian monument. The elevators are the vessels that have carried people up and down the tower's living body for over a century, and the operators are their guardians. These people have heard snatches of millions of lives in numerous languages for over a hundred years. "Memory Strains" pays homage to these lives with acoustic fragments that flicker by creating a vertical flow of sound.

*Le Chef de Cabinet
du Président de la République*

Madame China BLUE
256 Maple Street
WARWICK, R.I. 02888
ETATS-UNIS D'AMERIQUE

Paris, le 20 AOUT 2008

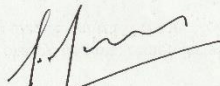
Chère Madame,

Le Président de la République française a bien reçu votre courrier.

Monsieur Nicolas SARKOZY m'a chargé de vous remercier vivement de l'aimable envoi du premier exemplaire de votre disque, intitulé "Under Voices Les Voix de la Tour Eiffel".

Il tient également à saluer votre talent qui a trouvé dans la Tour Eiffel, symbole de Paris, une source d'inspiration vous ayant permis de déployer votre créativité artistique.

Je vous prie d'agréer, Chère Madame, l'expression de mes hommages.


Cédric GOUBET

Référence à rappeler
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JULY 2009

Acoustics Today

Sounds in Space
Sounds of the Eiffel Tower
Environment for Auditory Research
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*A publication of
the Acoustical Society
of America*

United States Army's Environment for Auditory Research Laboratory

How the intersection of audio technology, architecture and art can change our perception of what we thought we knew

The sound of human spaces is defined by human expectations. Architects consider sound based on how vibrations affect the structural integrity and the acoustics of residential and performing spaces. Bioacousticians examine sound based on its effects on living organisms and how it affects their behavior in the environment. Musicians and artists judge it by how it impacts their creations and their listeners. However, as in many fields, crossing categories can generate a hybridized result, and allow new, enriched sonic experiences to emerge. In the pursuit of a new way to consider the intersection between structure, space and human sound, in September 2007, I went to Paris to reexamine the Eiffel Tower.

My plan was to create a sound environment based on what I expected to hear—the sounds of traffic around the base, human voices and footsteps—the normal sounds we hear from any human urban space, the differences largely based on the linguistic mix of a tourist site in a foreign country. But shortly before receiving authorization by the Société d'Exploitation de la Tour Eiffel to do the recording, by chance I had come upon some near-infrasonic sound recordings based on seismic events—earthquakes, temblors, underwater recordings of tsunamis—and I was intrigued with the possibility of trying to expand my recordings to including what I previously had thought of as beyond human hearing—infrasonic recordings. I managed to obtain some “can” geophones from a surplus house and after some test trials, decided to include the infrasonic and near-infrasonic in my recordings of the tower. I realized that I had no idea of what I would capture (possibly nothing useful). But, following in the path of Gustave Eiffel, the builder of the Eiffel Tower who used it as his private laboratory for his scientific research, it was an experiment.

My goal was to record using two different methods. One would be to use the geophones to record the actual vibrations of the iron of the structure, the other was to record the social experience of being there. People usually specialize and record either the subsonic or the ambient soundscape, but normally not both. Yet, from my prior recording work I concluded that to capture the full acoustic environment, it was important to sample both ranges of the structure. By doing this I would collect not only the physical impact of the structure but also the social impact. For this work I had the help of 8 technicians, 6 from France and 2 from the United States.

“Social impact operating in conjunction with the structural acoustic elements creates a complex and dynamic sonic ecology that helps to extend our knowledge of how we perceive our sonic world.”

Seth Horowitz, a member of the Acoustical Society of America's Technical Committee on Animal Bioacoustics, came on board as the Chief Technical Officer for the project.

The process

The multiple levels of the Eiffel Tower were the inspiration to try out multi-level recording—examining various points in the tower using multiple recording techniques. To achieve this, we used two types of microphones. The first was the can-type geophones (with resonant frequencies of ~14 Hz) connected to 100 meter cables. These sensors are normally used for monitoring seismic activity, but we adapted them for this purpose because they would successfully capture the subsonic vibrations. We recorded from two geophones simultaneously on separate channels onto a single 4-channel digital recorder (Zoom H4) to allow us a hard-wired method to avoid any differences in time of the arrival of sounds across the potential span of 200 meters. The next method we used was recording via in-ear stereo binaural microphones. These microphones pick up sounds that have a very human feel based on their position in the ear canal and allow the external ears to shape the sounds to be similar to what a person normally hears and create a very personalized and “human” sounding recording. The binaural recordings were captured on a Sony portable DAT deck. In addition, a third “wandering” team member carried an additional Zoom recorder using built-in microphones configured for long distance (shotgun-style) recording to capture any additional ambient or transient sounds. All recordings were done at 48.1 kHz/16 bit sampling.

The planning and transporting of the equipment was an extensive and stressful process. We were traveling from the US to Paris, France with two Zoom H-4s, one Sony Digital Audio Tape (DAT) recorder, six 100 meter lengths of XLR cables, 6 customized geophones, a pile of Secure Digital (SD) memory cards and DAT tapes, and of course the inevitable rolls of electrical and duct tape. I was primarily concerned whether the equipment would pass security inspection since there was a likelihood that the equipment might look like material to create a bomb. So to avoid any problems, I placed instruction manuals for everything in the suitcase and the authorization to record the Eiffel Tower in hopes that if anyone opened the case, they would have complete description of what was inside. Fortunately we had no trouble with authorities until we were actually on site.

We arrived at the Eiffel Tower that fall morning at 9:00 a.m. with all of the equipment ready to do a test recording



Fig. 1. Some of the equipment. The Zoom H4 is not shown. Credit: China Blue.

(Fig. 1). That morning just as Dr. Horowitz and I were first setting up the equipment, a lead to one of the geophones broke. This was my worst nightmare because although I brought 6 sensors, that morning only two were on site and the rest were at the hotel a few miles away. Additionally, the one thing I didn't pack was a soldering gun and I had no idea of how to say "solder" in French, much less where to find the equivalent of a Radio Shack in Paris. I looked down at the situation and then Dr. Horowitz and I just looked at each other in agony as attempts at wrapping the geophone in electrical tape were clearly not going to work. Dr. Horowitz happened to be chewing gum at that moment; I paused and then it came to me. I asked him for his gum. He looked a bit tentative but handed it to me and we used it to try to repair the connection. I didn't think it would work but fortunately it worked perfectly for the entire duration of the recordings, and even as I am writing this today the gum is still connected to the sensor. Perhaps the lesson learned was to always travel with an extra pack of peppermint gum (Fig. 2).

With our recording gear working, we had to consider the best plan to capture the full range of sound and vibrations of the tower. We were expecting to record infrasonic and sonic vibrations based on the movement of the elevators as they transport the visitors up and down, and the vibrations of the tens of thousands of feet that walk across it every day, as well as the whining of the wind through the tower and the human sounds of her visitors. These are the forces that transfer energy to the 2,500,000 rivets and 18,038 pieces of iron of the tower. We originally planned to record at each level using both the geophones and the binaural microphones, but my original plans to record with a geophone planted on separate pillars of the tower on the ground level was logistically impossible so it was not going to work out. Aside from construction going on at one of the entrances that blocked our access, the wind and rain on that September day was blowing at up to 10 km/hour, the temperature was a chilly 12°C and the rain was shifting from a constant mist to a near-horizontal deluge. However, breaks in the weather allowed us to carry out the alternate record-

ings designed. While members of our team walked about on the ground level with the in-ear binaural recorders and the additional shotgun microphones, Dr. Horowitz and I set about the first geophone recordings (Fig. 3).

We decided to set up the geophones on two separate legs that enter the stone at the base of the North pillar (Fig. 4). This seemed the simplest technique but did in fact cause some minor havoc—a miscommunication between the tower's security manager and the local *gendarmes* led a squadron of startled French soldiers to start yelling at Dr. Horowitz in high speed French to come down and put down what clearly must have looked like a small wired bomb. The raised machine guns made the point and our recording session was over until the manager who fortunately was nearby came and cleared up the issue.

Once in position, via clambering on the stone supports with rolls of duct tape, the two geophones were calibrated and tested to see if we would get signal crossover from one leg to another. As soon as we started recording, we found that even with a best frequency in the near-infrasonic range, we were able to hear a rich acoustic signal. During the 20 minute recording session we captured both the wind's force against the structure as well as the elevator's intermittent movements as it passed from floor to floor. If you have downloaded the audio material (Editor's note: see "Directions to download the interactive Audio Clips and Track Samples" at the end of the article) you will hear the ground-level near-infrasonic



Fig. 2. Peppermint gum used successfully to repair broken solder joint Credit: China Blue.



Fig. 3. China Blue monitoring the recording in front of the Jules Verne Restaurant on the ground level. Credit: Seth Horowitz.

recording that was produced (Clip 1).

We also used this same method to record in the sub-basement. This area that is out-of-bounds to visitors is a room where all of the motors, gears, pulleys and accumulators are housed that run the whole system some of which are original and now over 120 years old. We placed the geophones on the metal foot bridge that amplified and resonated with the vibrations of the machinery housed on the floor below. There we monitored the chassis that pull the elevator gears and cables and the accumulator that makes a spewing sound as it spills oil to let the elevator ascend (Figs. 5, 6). We also heard the emergency alarm that went off when one of the elevators temporarily stopped and the workers running and yelling as they responded to the alarm. That was when Dr. Horowitz said that I broke the Eiffel Tower. Here a sample of the geophone recording of the carriage in the machine room can be heard. (Clip 2).

Ascending from the sub-basement via a service elevator, we next decided to record from the summit, just in case the weather would prevent such recordings later in the day. At the summit, we positioned the seismic sensor system on the outside railing that runs continuously around the tower on this level. There we captured a separate recording of the wind blowing against the summit at the elevation of about 1,000 feet (Fig. 7).

We also applied this method to the service stairwell landing (just under the summit—another area closed to tourists).

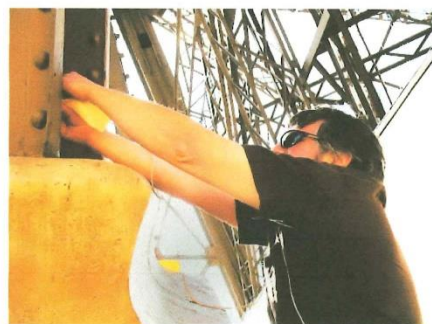


Fig. 4. Seth Horowitz placing the seismic sensor on the iron at the base of the Eiffel Tower. Credit: China Blue.

In this region are the fire escape stairs and service access areas that are adjacent to the open elevator cages. There we placed the geophones on a metal grating to capture the sound of the elevators going by as they moved within inches of our faces (Fig. 8, Clip 3).

For the ambient sonic recordings, we primarily used the in-ear binaural microphones attached to the DAT for a period of 20 minutes at each location. I assigned a team member to monitor the binaural system and whenever possible, the individual would walk in a snail shell or circular pattern moving from the inside out to capture the ambient acoustics on each level. On the ground level this was an easy walking pattern. This is a large open area where people clustered in groups and we were able to capture street sounds, the sounds of the on-going construction on the lower level of the Eiffel Tower, and visitors queuing up to get into the tower. Listen here to the binaural recording at the ground level (Clip 4).

The snail-shell recording pattern could not be applied in the machine room area because our work area was limited to two narrow staircases and the metal service bridge that overlooks the floor below where the elevator equipment is housed. Although this recording area was physically limited there were fascinating mechanical sounds that we were able to capture (including the emergency alarm). The sounds of the emergency in the machine room were caught on the binaural recording (Clip 5).

The area just under the summit is a narrow metal main-



Fig. 5. Chariot pulling the cables in the sub-basement. Credit: France Languérand.



Fig. 6. Another view of the sub-basement equipment with a portion of the large orange accumulator on the left. Credit: France Languérand.

tenance staircase surrounded by the open geometric patterning of iron that forms the structure. There again, the binaural recording method was limited to the staircase, but what was captured by both the geophones and binaural microphones was remarkably dynamic: regular metallic clattering of the ascending and descending elevators, second harmonics of the wind through the infrastructure, and of course the occasionally radical changes in noise as wind screens were blown off by gusts (Fig. 9, Clip 6).

On a clear day the summit provides spectacular views of the city—up to 40 miles away. That day, however, there was a taxi protest so when we looked down we saw the taxis lining the streets for hours protesting for a wage increase. While we were told that this was not that unusual, the semi-constant tones of French taxi horns were fleetingly picked up, even miles away and 300 meters up, underneath the more local sounds of the wind, rain and of course human voices. One of the more interesting moments sampled was a group of children seeing the Eiffel Tower for the first time. Their enthusiasm was contagious (Fig. 10, Clip 7). In this clip you will also hear the geophone recording of the high-pitched whistling of the wind. This is an exciting example of the wind's energies sending waves and vibrations through the tower's structure.



Fig. 7. Placement of the geophone on the railing with a view of the Champ de Mars below. Credit: Seth Horowitz.

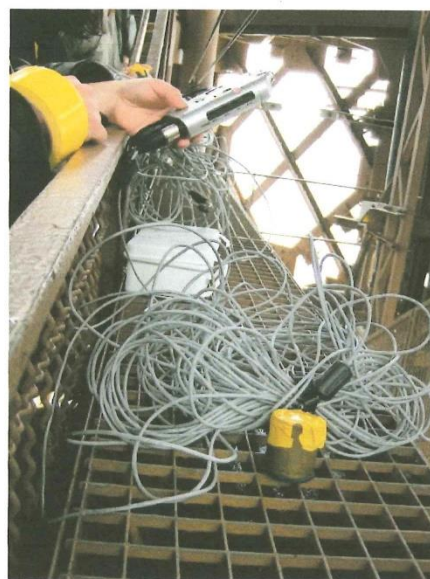


Fig. 8. Geophone positioned on the metal grating in the service stairwell underneath the summit. Credit: France Languérand.

How does recording beyond the normal sonic range change how we understand sound?

Vibrations are anywhere there is energy and a medium to transfer it. The sources are from the forces of the wind, rain and snow, the machines that operate in or around the structure, and from people moving through the space. Materials used in the construction of structures respond differently to these sources, and although we do not hear them all, it is the vibrations that create the total sound field of a structure. To experience and perceive this full range, we need to extend our own sensory range and bring those below (or above) it into the realm of human experience.

At a practical level, as the goal of this project was to create a sound art/musical piece, I needed to be sure that the entire range of acoustic signals, even those below the normal range of human hearing (not to mention speaker performance) would be audible to listeners. While the geophones picked up sounds in the range of 1-40 Hz, analysis and editing software showed some of the more interesting vibrational signals were, as expected, well below 20 Hz. To bring these sounds into the listener's range, I inverted a method from bioacoustics that allows humans to listen to ultrasonic bat signals and used a pitch shifting algorithm to bring the lowest frequencies into the audible range.

A good example of the usefulness of extending our acoustic range can be found in the seemingly unrelated field of animal behavior. Animal behavior has often been studied by using the most basic (and useful) of tools—our own eyes



Fig. 6. Another view of the sub-basement equipment with a portion of the large orange accumulator on the left. Credit: France Languérand.

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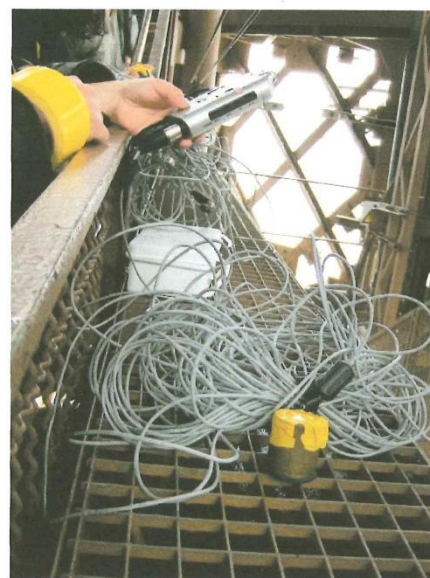


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Fig. 9. Service stairwell underneath the summit. Credit: France Languérand.

and ears. However, this works best when we observe animals like ourselves—daytime dwellers whose sounds we can hear. But relying on these techniques causes problems when the subject of study is more exotic. For example, it was largely thought that big brown bats (*Eptesicus fuscus*) hunted insects at night in clearings; however, it was not until studies were carried out using thermal vision cameras, allowing real-time tracking of the animals' movements in total darkness at a distance outside of the lab, that these limitations were found to be artifacts. Big brown bats in fact carry out highly acrobatic maneuvers even in thick vegetation.¹ In this paper, James Simmons pointed out that the limitations of the usual methods of observation restricted how behavior was assessed. The "system proved superior for making observations of bat behavior at night because the bats are nearly always visible and can be followed for as long as they remain in line-of-sight out to 50-100 m or so."² And, what he concluded is that new technology enables us to come to new understandings of the world around us. This is what we discovered with the new equipment used to record at the Eiffel Tower. We were able to understand it and see it in a new way, through her sounds.

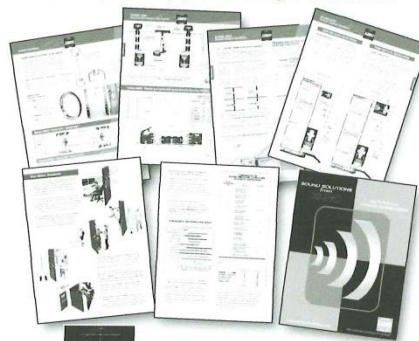
Throughout history few scientists have studied sound in relationship to structures. Christiaan Huygens in 1692 was possibly the first to map the movement of sound in space based on reflections. His discovery, "l'Echo" later became known as a Repetition Pitch, was discovered when Huygens "noticed that the noisy sound from a fountain pro-

duced a certain pitch. He was able to determine the height of this pitch by matching it with the pitch produced by a 'closed organ pipe.'" This work was later confirmed by Bilsen in 1993, with contemporary methods and equipment.³ Similar architectural pitch shifting was discovered at the Kukulkan pyramid at Chichen Itza, a Mayan ruin in Mexico in 1998 by David Lubman.³⁴ There he discovered that hand claps are heard as chirps as they reflect off of the pyramid stairs. Lubman determined that these were periodic reflections off of the stair surfaces. In addition, Anish Kumar described the interesting musicality of the Vitthala Temple in Hampi in South India. If you strike a column with your finger it produces a sound, with the frequency varying, depending on the column struck.⁵ The increasing interest in this crossover between architecture and acoustics has also led to a steady growth in both research and practical applications of architectural acoustics for design of human spaces ranging from symphony halls to quiet work areas.⁶

What is compelling about these viewpoints on sound and architecture is that they analyze the physical nature of sound movement in relationship to the surface of a structure—rooms in the case of Salter, stairs in the case of Huygens and Lubman, and columns in the case of Kumar. The difference between these works and what we accomplished was that we recorded the actual vibrations trans-

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- ³ David Lubman, "Convolution-scattering model for staircase echoes at the temple of Kukulkan," *J. Acoust. Soc. Am.* 123(5), 3604(A) (2008).
- ⁴ David Lubman, "An archaeological study of chirped echo from the Mayan pyramid of Kukulkan at Chichen Itza," www.ocasa.org/MayanPyramid.htm (Last viewed 8/13/2009).
- ⁵ Anish Kumar, T. Jayakumar, C. Babu Rao, Govind K. Shama, K.V. Rajkumar, Baldev Raj, and P. Arundhati, "Nondestructive characterization of musical pillars of Mahamandapam of Vitthala Temple at Hampi, India," *J. Acoust. Soc. Am.* 124, 911-917 (2008).
- ⁶ Charles M. Salter Associates, *Acoustics—Architecture, Engineering, the Environment* (William Stout Publishers, San Francisco, 1998).
- ⁷ Eiffel Tower Fact Book, <http://www.paris-eiffel-tower->

news.com/eiffel-tower-stories/eiffel-tower-fact-book.htm (Last viewed 8/13/2009)

- ⁸ R. Barthes, *The Eiffel Tower and Other Mythologies* (University of California Press, Berkeley, 1997).

Editor's note: Directions to download the interactive audio clips and track samples

Shortly after the print copy of this issue is mailed, it will also be published in the Acoustical Society of America's Digital Library. The *Acoustics Today* main page can be found at <http://scitation.aip.org/AT>. Alternatively, the Table of Contents for this issue may be reached directly by going to your internet browser and typing the following Uniform

SOUND ART AND SCIENTIFIC TECHNOLOGY

The sampled sounds from all of the areas of the Eiffel Tower became the basis of a final art piece, published on both a CD and a thumb drive—*Under Voices: Les Voix de la Tour Eiffel*. In this compilation, the recordings of the sonic space as well as the structural vibrations of the Eiffel Tower were used.

The six pieces on the CD were created from a diverse array of multi-level compositional influences that provided the structural envelope for the raw material. First and foremost the usage of ambient sound (noise) is a nod to *Musique concrète*, a style created in the early 1950's by Pierre Schaeffer; this is, a form of music that uses raw sound as a compositional device without the requirement for it to be traditionally "musical." But as these are contemporary times with contemporary influences that cannot be ignored, the acoustic narrative style of Pink Floyd was the inspiration to provide a backbone while new technology based concepts are captured with the use of dial-tone multi-frequency (DTMF) i.e., touch-tone telephone tones. Samples of each of the tracks on *Under Voices: Les Voix de la Tour Eiffel* have been included on the download. The CD and thumb drive are available at www.chinablueart.com.

Under Voices: Les Voix de la Tour Eiffel (China Blue)

Under Voices: (Sous Voix) uses the recordings of the wind in full force on the summit. There on the summit, sometimes it takes more than your own strength to stand up against the wind as it blows through the iron beams. Yet, while you can feel and hear a high pitched whistling, most of the wind's energy is spent in sending waves and vibrations through the tower's structure. Largely unnoticed, the impact is very much there. This track is the unheard song of the tower in the wind.

The Wind and the Accordionist (Le Vent et le accordéoniste) and *The Wind and the Accordionist, Reprise (Le Vent et le accordéoniste)*. Edith Piaf is an icon of French music. Her voice, heard in combination with the tones of the accordion, are what evoke a classically romantic image of Paris. *The Wind and the Accordionist* weaves samples of her classic

songs with sounds of wind through the tower to create a nostalgic sonic mosaic of French culture and architecture.

Crypto Keys (Les Messages Cachés). The Eiffel Tower is not just a tourist attraction. It has been involved in communication and counterespionage in two world wars because it possesses one of the tallest radio towers in the world. During World War I for example, "the tower's radiotelegraphic center was used to intercept enemy messages, one of which led to the arrest and execution of the infamous Dutch dancer and spy, Mata Hari."⁸ *Crypto Keys* captures the Eiffel Tower's surveillance capability in wartime with shortwave spy messages from the era. Other hidden acoustic information is imbedded in the piece in the form of DTMF tones which were derived from statistics of the Eiffel Tower including features such as its height, how many pieces of iron were used to build it and how many rivets hold it together, etc.

Memory Strains (Les oreilles de l'ascenseur). The elevators are the vessels that have carried people up and down the tower's living body for over a century, and the operators are their guardians. These people have heard snatches of millions of lives in numerous languages for over a hundred years. *Memory Strains* pays homage to these life stories with acoustic fragments that flicker by—in a vertical flow of sound.

Iron Rhythms (Les Rythmes de la fer forgée) ring throughout the whole tower but rise from the structure unseen by almost everyone. A mechanical underworld supports the complex building above. This piece is based on the rhythms and sounds of the machine room from the humming and pounding of the "chariots" to the sounds of the elevator motors that constantly push them up and then bring them back down the structure.

The Woeful Tale of Jack the Snail. In the style of multi-track sampling, I asked Lance Massey, the creator of the T-Mobile ring tone, if he would like to make a piece from the selection of raw files. From this material, he created *The Woeful Tale of Jack the Snail*. This wonderful pop piece tells the story of Jack the Snail's short and tragic life.

Resource Locator (URL) in the address block: <http://scitation.aip.org/dbt/dbt.jsp?KEY=ATCODK&Volume=5&Issue=3>. At some point in the download process you will probably be asked for your Username and Password if you are using a computer that is not connected to an institution with a subscription to the ASA Digital Library. These are the same Username and Password that you use as an ASA member to access the *Journal of the Acoustical Society of America* online.

Open the abstract for this article by clicking on

Abstract. At the bottom of the abstract will be a link. Click on the link and a zipped folder (ChinaBlueData.zip) will be downloaded to your computer (wherever you usually receive downloads). Unzip the entire folder (as a whole) and open the folder (ChinaBlueData). Do not remove any files—simply open the file called “00_OpenMe.” It is an interactive pdf file. By clicking on any of the Hyperlink Clips in this file or on any of the Hyperlink Track titles, you should hear the audio selection. Questions? Email the Scitation Help Desk at help@scitation.org or call 1-800-874-6383.



China Blue. Credit: France Languérand.

China Blue is an internationally exhibiting artist who is the first person to record the Eiffel Tower in Paris, France. She pursues the intersection of sound and architecture. Her work has been shown in galleries and non-profit spaces in Finland, Sweden, France, the United Kingdom, and the US. She was the United States representative at OPEN XI, Venice, Italy, an exhibition held in conjunction with the Architecture Biennale. Her work has also been shown at the Melbourne International Arts Festival in Australia and the Armory Fair in New York. Reviews of her work have been published in the *New York Times*, *Art in America*, *Art Forum*, *artCritical*, and *NY Arts* to name a few. She has been interviewed by France 3 (TV), for the film “Community” produced by the Architecture Institute of America and was a featured artist for the 2006 meeting of the Acoustical Society of America. She has been an adjunct professor and Fellow at Brown University in the United States. Her work is represented by Galerie Barnoud, Dijon, France and Art Currents, New York, NY.



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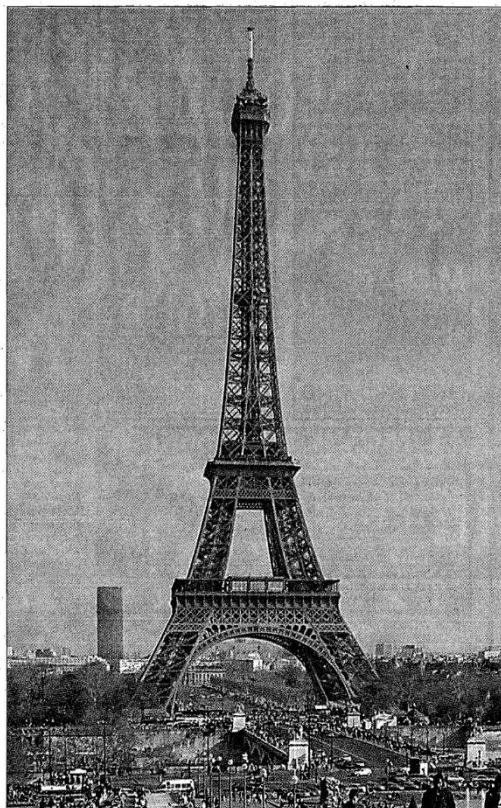
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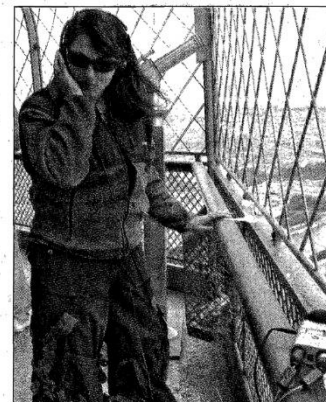
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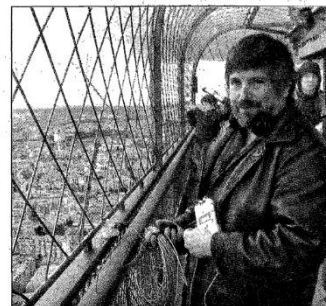
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CHINA BLUE WONG

China Blue Wong, top, and husband, Seth Horowitz, above, record the sound of the Eiffel Tower, left. Sometime in the next few months, Wong says she'd like to take her tower recordings and turn them into installation art, what she calls a "sound sculpture."

EIFFEL TOWER SOUNDS OFF

And Brown professor China Blue Wong is making art out of her recordings

BY BRYAN ROURKE
JOURNAL STAFF WRITER

Most people simply look at the Eiffel Tower. China Blue Wong listens to it.

You can, too.
Wong, an adjunct professor in Brown's art department and a fellow in its psychology department, recently returned from Paris. There, she made recordings on and around the soaring steel structure: people visiting it, elevators traversing it and cars passing it.

However, Wong also recorded the sound of the structure itself. This, she says, no one has heard before. That's because no one can — not

without special equipment, which, of course, Wong used.

The goal is art. The means is science. Sometime in the next few months, Wong says she'd like to take her tower recordings and turn them into installation art, what she calls a "sound sculpture," a room surrounded with speakers giving visitors an audio sense of place, namely the Eiffel Tower.

"There's an interesting balance between the human experience and the actual structural integrity that coalesces in the acoustic arena."

While Wong's installation is months away, the contributing elements for her art are available now for all to hear, and see:

www.chinablueart.com/eiffeltower.htm.

The site shows pictures of the four places on the tower where Wong recorded: the basement machine room for the elevators; the ground level in front of a restaurant; and two observation landings, one half-way up and the other at the top. At each site, Wong recorded for 17 minutes. She used binaural microphones, one on each side of her head, which register the direction of ambient noise.

"What's recorded is from your vantage point. It makes it very personal."

And Wong used seismic microphones,

SEE SOUND, D3

'Sound sculpture' may take you to Paris

Continued from Page D1

normally used by geologists to measure tremors in the earth, to record vibrations in the tower, which is made of 18,038 pieces of steel and more than 2.5 million rivets.

"Those are all opportunities for vibration. As soon as you get a hole with a rivet through it, that's an opportunity to play, movement."

The wind, the people, the elevators all contribute to the tower's changing vibrational noise. At times it sounds vaguely like an underwater recording of a whale, or, better yet, the foreboding background mood music in some suspense movie, a little eerie and haunting.

Wong wants to use both sets of recordings, the binaural and the seismic, to create her art.

"It would mimic the experience a visitor would have and also provide something different that a visitor wouldn't experience."

In late September, Wong and her

husband, Seth Horowitz, an assistant professor of psychology at Brown, along with five others, went on a recording expedition of the Eiffel Tower. It was, according to Wong, the first time vibrational readings were taken of the tower.

"Sometimes, you just have to ask."

The tower officials gave Wong permission to attach her seismic microphone on various sites of the tower, including the basement, where the public is not permitted.

Among the ambient sounds you'll hear are the distant horns of cars caught in traffic, the basement alarm blaring from a rare malfunction of the tower's elevators, and a typical remark of a tourist arriving at the top of the tower: "Holy crumb!"

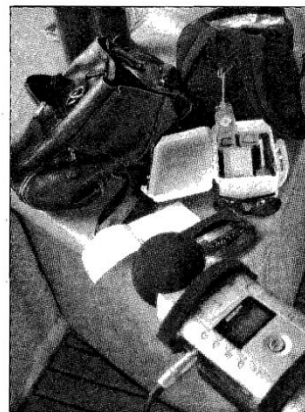
Wong has previously created audio art works connected to specific places. In 2006 in one work, "The Calls," she compiled telephone messages and airtraffic controller recordings made during the Sept. 11, 2001, terrorist attacks. And last year

in another work, "Negative Eclipse," she made vibrational recordings of an indoor 13-foot steel sculpture created by Richard Serra. That sculpture, however, was made of one piece of metal, which yielded mild vibrational sounds compared to the Eiffel Tower.

"It's a completely different situation. You have tons of pieces and bolts and people walking through it and elevators going up it. You have all these different energies playing on the surface."

Someone might say that the particular steel structure may not matter, and that seismic recordings could be taken of such things as a steel bridge or high-tension tower. But those things, Wong says, "don't have social value. The Eiffel Tower has a history to it."

The tower, designed by Gustave Eiffel, was built in 1889 and was the world's tallest structure at the time, 1,063 feet. It was built as part of a World's Fair and was meant to mark the 100th anniversary of the French



CHINA BLUE WONG

Recording equipment used by China Blue Wong at the Eiffel Tower.

Revolution. It was not intended to be permanent. But its popularity, with

more than six million visitors annually, has made it so.

"It's a spectacular structure. For me, there are personal reasons."

Wong, who has an Eiffel Tower doormat, wine rack and salt-and-pepper shakers at her Warwick home, visited the tower for the first time in December 2005. While standing on the viewing stand at its top, she became engaged.

About a year later, Wong was thinking of audio art projects she could pursue.

"It started out, 'Wouldn't it be cool if ...'"

Wong has not yet taken her scientific recordings and turned them into art, and can't say what mood or message her art may convey.

"The content of the art would create its own story. It doesn't have to lean on the story of the tower. It will be its own experience."

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China Blue - Under Voices

[China Blue Art]

Les voix de la Tour Eiffel heißt es im Untertitel, d.h., das China-Blue-Album befasst sich nicht nur mit dem ungeheuer starken Wind, der um die Spitze des Turms bläst, oder der einzigartigen und komplexen Struktur dieses seltsamen Gebäudes, auch nostalgische Elemente z.B. im Spiel mit Edith Piaf, dem Akkordeon-Spieler um die Ecke oder mit mehrsprachigen Kurzwellen-Fetzen, wie sie bereits zu Spionagezwecken in den Weltkriegen des letzten Jahrhunderts eingesetzt wurden, kommen zur Geltung und bereichern Under Voices sehr. Die Aufmachung lässt leider stark zu wünschen übrig. Mageres Design und die vielleicht zu dick aufgetragene persönliche Verbindung der Künstlerin zu ihrem Soundobjekt, nachzulesen im Booklet, mögen fast zum Weghören einladen. Auch der letzte Track, Lance Masseys Mashup der Originalaufnahmen, bleibt wegen fehlender Bindung und Qualität jetzt besser unkommentiert. Dennoch bleibt stehen: Ungeahnte Qualitäten des Eiffelturms tun sich hervor, was natürlich auch auf China Blues intime Herangehensweise zurückgeht. Ein ambitioniertes und durchaus gelungenes Projekt.

www.chinablueart.com

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Articles and Press

Bryan Rourke, Eiffel Tower Sounds Off, Providence Journal, October 12, 2007

Sarah Gordon, Prof to turn Eiffel Tower into Sound Art, Brown Daily Herald, Issue date: 10/1/07

Davide Riccio, "Il Canto Della Tour Eiffel - Insolita Musica," Kult Underground, July 2008

Interview, Giant Ear))) for Free 103.9, December 28, 2008

China Blue, "The Sounds of The Eiffel Tower", Acoustics Today, Volume 5 issue3, July 2009

China Blue-UnderVoices, DeBug, August 24, 2009, "An ambitious and very successful project," <http://de-bug.de/reviews/36482.html>.

Further Noise Review, February 2009,
<http://www.furthernoise.org/index.php?url=page.php&ID=281&iss=77>

Personal Email from Paul Hasegawa-Overacker, Producer of Guest of Cindy Sherman and writer for Art Net:

"Her work is real art. It can affect my emotional environment. The complex sonic layering is calming, bright, elevating and woven with a rich visual palette. Brilliant work in the vein of early Terry Riley."

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