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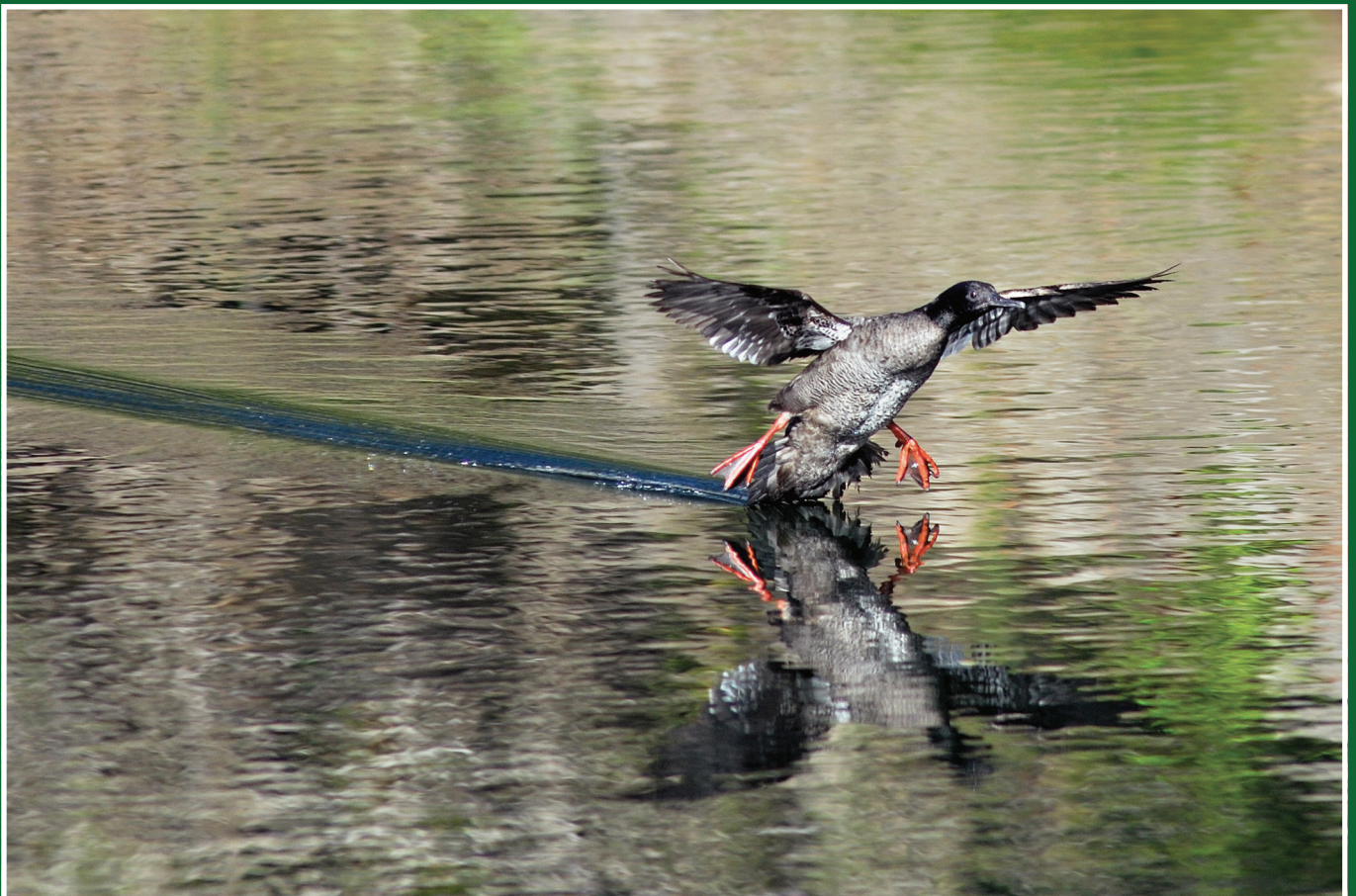
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## Obituary – Jacques M. E. Vielliard (1944-2010) life and legacy

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The Brazilian Ornithological community trembled on August 2010 upon the sudden and unexpected death of the father of Brazilian Bioacoustics, **Jacques Marie Edme Vielliard**. He was still very caught up in his work, and had fruitful years ahead of him with important publications on many fields involving ornithology and bioacoustics. For instance, his bioacoustical method on quantitative ecology had successfully determined the diversity of a few localities of complex tropical habitats, and the results were promising. He was managing to record sounds of the remaining Brazilian bird species that somehow were not yet in his collection, but also conducting a huge job on maintaining and improving the sound archive conditions both in UNICAMP and UFPA. Also, he was working in a bioacoustics book that would for sure allow the consolidation of his 50 years of research and discoveries on the field. His abrupt death is certainly a huge blow on the world bioacoustics.

He was born in Paris in August 22, 1944, the day of Paris liberation by the allies during the Second World War. Thus, he had a tough childhood, living in a country under reconstruction. He was a prodigious kid and had only 14 when he gave his first lecture, and only 18 when he departed for his first of many international field missions. His report, with over 400 pages, helped the creation of Doñana National Park, the first in Spain. But this was just the first of many great deeds. The International Wildfowl Research Bureau sent Jacques for an intensive fieldwork from Romania to the Himalayas from 1967-1971. His interests were mainly aquatic and migratory birds, and the data he acquired was used in his PhD, concluded at *École Normale Supérieure* in 1971, on the ecology of the Dunlin *Calidris alpina*, a species that reproduces on tundra habitats, but winters on the coast.

Due to political changes on Asia, he would have to switch his field effort to Africa, financed by the French Agency ORSTOM. He aimed to study the Central African bird diversity at lake Tchad (on the border of Chad, Cameroon, Niger, and Nigeria, nowadays the lake has dramatically decreased in size due to climate change and human demand for water). His biogeographical studies showed that there was no Central Africa biogeographical area, but a well-defined transition area between the

Oriental and Occidental African biogeographical areas. This was a productive time for Jacques, as the expeditions lead to the first sound guide of this African region, and also the discovery of the last bird described for the Palearctic region, the Algerian Nuthatch *Sitta ledanti* Vielliard 1976.

A visit of the president of the *Academia Brasileira de Ciências* (ABC), Aristides Pacheco Leão, would change Vielliard's life forever. Dr. Leão (a prominent Brazilian scientist and also an ornithology enthusiast) was in France searching for scientists willing to establish ecological field research in Brazil, and Jacques Vielliard was rapidly convinced to make the first of his four ABC expeditions in



**FIGURE 1:** Jacques Vielliard in the 80's, listening to sound recordings at his lab at Campinas State University. (Photo: Antoninho Perri).



Brazil. The expedition also included the famous Brazilian ornithologists Helmut Sick and Augusto Ruschi, and also the botanist Dárdano de Andrade-Lima. This might be considered a turning point in his life, as it would allow Jacques to meet many people in Brazil, and this led to the invitation from Zeferino Váz to establish a Bioacoustics lab at the recently created and promising *Universidade Estadual de Campinas*, in 1978, where he would work until his death. The invitation of Jacques Vielliard first (at the time in his late 20's) by Dr. Leão, and later by Zeferino Váz to Unicamp, allowed Brazil to establish what would become a wide field of study: bioacoustics, the study of animal communication.

His most important legacy is probably the creation of the *Arquivo Sonoro Neotropical* (Neotropical Sound Archive, ASN), the largest for the Neotropical region, and one of the most important in the world. It has about 30.000 high fidelity sound recordings, and is currently being digitized. His project was a web-based SQL software, which would allow for worldwide access either to download or upload sound files into his library. These files would be kept in Campinas, but with security copies in Belém (State of Pará) and under the bunkers of the British Library in London, “where it would be protected

from an atomic war”, as he would say with a childish smile. This is an ongoing work that is kept under the responsibility of ASN's current curator Wesley Silva, a former Student and currently an Associate Professor in the same Department that Jacques has worked for most of his life. Jacques had also started a sound archive in the state of Pará, the *Arquivo dos sons da Amazônia* (Amazonian Sound Archive, ASA), where he had been working in the past years. His main objective was to complete his collection of Brazilian birds, as he felt that Amazonian biodiversity was not properly sampled.

The ASN came from the necessity of proper bird identification through sound, so he could develop ways to measure diversity through bioacoustics. He had tried that on the early 70's but rapidly noticed that he would need to better describe the rich and diverse tropical bird calls if he was to create a methodology for ecological studies through bioacoustics. In fact, his methodology to describe diversity based on sound (Vielliard e Silva 1990) is one of his most famous papers, and despite the fact that he has published it during a scientific meeting, it is requested over and over in ornithological groups, or directly through his e-mail. He proposed an indirect measure of abundance based on bird identification, which could be used to compare diversity between areas. While in Brazil Jacques managed to remain included in global bioacoustics discussions, even as he created this huge data set on Brazilian animal communication. He was, for example, member of the editorial board of *Bioacoustics*, the only magazine specific to the subject of animal communication. In fact he was complete as a scientist, as he gathered and described information on Brazilian animals in a herculean way, but also created new and original tools with the use of bioacoustics, and still managed to keep inserted in the main discussions in the area.

He took part in the discussion on how to use bird call parameters on Phylogeny, publishing papers on the subject, and also coordinating a round table during the XXI International Ornithological Congress in Vienna. The use of bioacoustical data in phylogeny brings a complex discussion, which has to incorporate call ontogeny, call stereotypy, habitat pressures, and also call variation (either geographic, population or individual). Altogether, these fields have a central role on how to use and what parameters would be best for phylogeny purposes, and he had stepped in all these fields. Despite Jacques did not work on any phylogeny *strictu sensu*, he proved bioacoustics might be used on taxonomy. For instance, he indicated that the Yellow-faced Parrot (formerly *Amazona xanthops*) was closer to *Pionus* than to the *Amazona* genus (Vielliard 1994). This was later corroborated by cytogenetic and molecular data. Today the species is widely accepted as *Alipiopsitta xanthops*, and it is considered to be closer to *Pionus* than to *Amazona*, just as Jacques had proposed using solely bioacoustical data.



**FIGURE 2:** Jacques Vielliard at his lab in Campinas, showing part of his sound collection during a paper interview on the digitization of ASN in 2008 (Photo: Antoninho Perri).



As a scientist, he was deeply concerned with the proper definition of concepts. What is a call, a syllable, a pulse, a song? His concerns with the proper definitions of basic concepts in bioacoustics are recurrent, and have been the topic of many discussions with his students. It may also be illustrated with his paper on this very magazine, in which Jacques felt that a great chance was lost in the Handbook of the birds of the World, as instead of defining concepts the authors used the space to make a somewhat less general work. He defined the concept of functional song as the song that presents the species-specific code, as he noticed that not every call presents this characteristic. This would imply in a distinct use of functional and non-functional song under bioacoustical analysis, making it a crucial definition. He has a paper restricted to bioacoustical definitions, which also demonstrates his concerns on the subject (Vielliard 1987). Another example of proper use of concepts comes from song versatility. He had observed that while some species presented highly predictable songs, other presented very rich and unpredictable ones. But how can song versatility be measured? The solution was found (together with his partner Dr. Maria Luisa Silva, and her supervisor Dr. José Castilho Piqueira) through the use of Shannon entropy index, widely known by biologists as a measure of diversity, but with the original purpose of measuring

information. He put the concept back onto its original purpose, and had successfully measured song versatility for a couple of Brazilian species.

Brazilian bioacoustics has a historical bond with France, as Hercules Florence, a French naturalist member of the Langsdorff expedition, was the first to acknowledge the specificity of birdcalls, as he made a rudimentary try to describe bird species through the use of the music pentagram. Florence had settled and married in Campinas, and Jacques translated Florence's original manuscript in a book entitled *A Zoophonia de Hercules Florence* (1993). Through the observation and knowledge of Brazilian bird communication, and also using the call specificity originally proposed by Florence, Jacques managed to describe two cryptic species from Brazil: the Amazonian Pygmy-Owl *Glaucidium hardyi* (1989) and the Cipo Canastero *Asthenes luizae* (1990).

As the central reference on bird communication in Brazil he had the chance to work as an advisor on a couple of Brazilian movies, creating soundscapes that were used in *Deus é Brasileiro* (God is Brazilian, 2002), *Cinema, Aspirinas e Urubus* (Cinema, Aspirins and Vultures, 2005), *O Homem da Lagoa Santa* (A documentary on the life of Peter Lund, 2005). He also supervised Tetê Espíndola (a major Brazilian singer) to make a record entitled *Ouvir/Birds* (Listen/Birds, 1991), inspired on the voices



FIGURE 3: Jacques Vielliard recording birds with his 1980's Nagra-E recorder, in 2008 (Photo: Antoninho Perri).

of over 200 Brazilian bird species. Jacques participated on the expedition to the state of Acre (Brazil), to acquire the necessary bird songs.

Jacques shaped a great number of professionals in the bioacoustics field, and also have acquired a great amount of data on Brazilian animal communication, so that he was successful on the mission given to him by Dr. Leão and Zeferino Váz. For instance, both of the authors of this paper are Vielliard's former students, and there are many others, so that, thanks to Jacques, bioacoustics is a well-established field in Brazil. But he was still quite active, and had many ongoing projects that involved a base camp, a lab-boat, and also included world universities in England, France, and Germany. He was currently working on his bioacoustics book, which could establish proper concepts, an old dream that could bring major field advances.

Jacques had malaria for 40 years, an illness he acquired during one of his many field expeditions. He was convinced that his fever came from his old illness, so that he waited too long to go to the hospital. Once he got to the hospital, he already had a large liver abscess, so that he suffered heart failure after liver surgery. Now we have to somehow deal with this great loss, quite a setback for Brazilian bioacoustics, and a profound loss for his family and his many friends, but specially for his four sons: Nicolas, Sophie, Nathalie and Christophe. Those who knew him well will always remember the happy, gentle and sweet man. His students will remember him by his generous and precise guidance. His former students have already started to honor him, through the naming of new species such as the recently described *Proceratophrys vielliardi*, and for sure many others will come. Brazilian bioacoustics will certainly decay in intensity together with its greatest exponent. But his ideas will reverberate among others, so that his legacy will propagate for a long time. *Au revoir, Jacques, profite bien de ton séjour parmi tes amis ailés.*

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