Bird’s music Episode#1: Introduction to our new instruments

Pauline Provini is studying sound formation in birds. She is searching for a correlation between syrinx morphology, the organ at the origin of sound production, and the type of sounds produced. This research has strong epistemic stakes, as previous research on the syrinx was mainly focused on syrinx morphology at different organizational levels, or general sound production mechanisms. But we found no mention of previous comparison between the type of sound produced by a bird and the morphology of its syrinx. It also has medical stakes, as comprehension of how a syrinx produces such a variety of sounds could allow us to create artificial syrinxes for people with larynx cancer who lost their voice, which would have a much larger scale of frequencies than the artificial larynxes that are currently used.

In the context of the SCORE project, we, Yakov Uzan and Irina Delamare, are working with Pauline Provini. Our objectives for these three weeks are to search and classify existing bird sound databases, to collect recordings of birds easily found in Europe, and to start analyzing the corresponding sound files. She will then use our work to look for a correlation between the different types of sound and the morphology of the syrinx that produced them.

First, we started by designing an action plan to frame the 3 coming weeks. Then, we looked into the existing bird sounds database and started a classification. We were looking for multiple criteria for each database: the license (if the sounds are free of use or not), the number of recordings and species, the average quality of recordings in each database, the presence or not of spectrograms and the ease of downloading sounds. We ended up with a total of 19 databases.

Secondly, we looked for articles to get familiar with the bird’s syrinx morphology and sound production. We did not find many recent articles about this subject apart from a book chapter by Suthers and Roderick, “How Bird Sing and why it matters*”*. Pauline Provini helped by giving us some bibliography she had gathered for this project. We thus familiarized ourselves with syrinx morphology, sound production mechanisms, as well as ecological advantages and functional advantages. This allowed us to be more at ease with the project, and to understand better what we are doing, and the context in which our research is settled.

Finally, we started collecting bird sounds using the Xeno-Canto database (the handiest sound database in the databases we identified). We are looking for one or multiple sounds for species in each bird order and most families, in order to have the largest range possible of bird sounds and syrinx morphologies in our sample. We are mainly looking for birds easily found in Western Europe as Pauline Provini plans to analyze syrinx on birds provided to her by the French Natural History Museum (MNHN). In this perspective, she also gave us the list of bird species currently held by the Museum.

In the coming weeks, we will try to finish our sound collection. Then we will establish a protocol of sound analysis. We are also thinking of generating a phylogenetic tree in order to visualize the different species we are using and their proximity, but we still have to reflect on the traits we want to build the tree on.