

Bone tubes are a type of artefact of which the interpretation of function is challenging. This is due to their simple design, which implies multiple possibilities for their use (needlepoint, straws, bead ornaments). (needlework, straws, bead ornaments). Bone tubes are discovered in various contexts, sometimes as sets of tubes. They are mainly made of bird or mammal bones, although antler artefacts of this type also occur. Sometimes there are holes in them that make them interpreted as flutes. A characteristic feature of bone pipes is the careful processing of the end and the presence of smoothing. This makes them similar to a particular type of wind instruments, in which a smooth and bevelled edge allows sound to be produced. Many of the artefacts (preliminary research suggests that this applies to around 90% of the material collected) have not yet been studied more extensively (e.g. in terms of microscopic or metric).

The aim of the project is to answer the question of how bone tubes were made and what they were used for by Eneolithic and Bronze Age societies in central Europe. Based on the preliminary results of the study, the hypothesis is that the tubular objects, variously interpreted so far, in fact most often served as aerophones (musical instruments or sound generators). The term 'sound generator' is broader than 'musical instruments'. In addition to musical instruments, it includes objects associated with the transmission of signals, or with the attraction of animals. Musical instruments are instead associated with music.

Bone pipes, which are the subject of my research, are found at sites of the Eneolithic Corded Ware culture (in the Malopolska region, Silesia, Moravia and the areas of the middle Danube basin, i.e. Austria, Slovakia and Hungary) and the Bronze Age Mierzanowice culture (in the Malopolska region). These lands constitute the territorial scope of my study. The chronological range is from approximately 2500 BC to 1650/1600 BC.

A variety of methods will be used in this project. A variety of methods will be used in this project. These will include microscopic analyses through which the production and use of artefacts can be reconstructed. Experiments will be carried out to make aerophones using tools available in the Stone Age and Bronze Age. It will be aided by information obtained from planned observations and interviews with people involved in instrument making (especially folk instruments or reconstructions of ancient instruments). The accurate models of the bone tubes will be prepared through the use of 3D printing. In addition, simulation of gas flow with acoustics will be carried out for some artefacts to allow digital sound reconstruction.

The result will be an answer to the question of how bone tubes were made and used by Eneolithic and Bronze Age societies in central Europe. A significant impact of this research on several disciplines is expected. With relation to archaeology, this project will contribute to the knowledge of prehistoric societies concerning sound-related activities. By generating reference data through experiments, producing copies of artefacts using raw materials and tools available in the Eneolithic and Bronze Age, future analyses of manufacturing and use traces on bone artefacts will be enhanced. Knowledge of the sound activities of prehistoric communities regarding the origins and development of music will be expanded. This project will also contribute to the overall development of archaeomusicology. An important outcome will be the development of a methodology for the study of bone artefacts with a view to resolving their relationship to aerophones.