

Recommendations for Field and Lab Identification of Potential Lithophones

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Ground stone artifacts are not normally collected during archaeological field work, primarily due to the paucity of curation facility space. Ground stone artifacts are also not collected, especially from the surface, based on the pre-conceived idea that this type of artifact is usually not considered worthy to collect because they are generally thought to have no potential to provide additional data. However, due to the general lack of knowledge about lithophones and the important data that could potentially be collected from these artifacts, it is recommended that any potential lithophones from surface or subsurface contexts be collected for further analysis and study.

To determine if an artifact has acoustical qualities in the field, or if a laboratory/museum specimen requires testing, it is suggested that the following steps be undertaken:

- 1) **To test the artifact for acoustical properties, the first step is to locate the two acoustical nodes or dull zones.** The two nodes are located at points approximately 25% of the total length from each end of the artifact, so these two spots can be estimated or measured based on the length of the artifact (Figure 1). The nodes are the two locations along the length of the artifact where the sound waves cross each other, and are the only two spots where the lithophone can be held, suspended, or placed on another medium without muffling the potential acoustical sounds.
- 2) **To be tested, the artifact needs to be held vertically, suspended, or raised above the ground or any flat surface at these two node locations.** It can be held vertically using minimal contact with one finger and your thumb at the uppermost node location (Figure 2). It can also be suspended horizontally or vertically on one or both of the acoustical nodes using leather strips or sturdy string (Figure 3). The artifact can also be positioned horizontally with the two nodes on top of narrow pieces of hard foam, narrow sticks or pieces of rope (Figure 1).
- 3) **A hard mallet is needed to tap on the artifact.** In the field, an elongated pebble made of a dense type of rock (like granite, basalt, schist, petrified wood, etc.) can be utilized (Figure 4). In the lab, an elongated pebble, piece of antler or hard bone can be used (see Figure 4), or if feasible, the best mallet for testing is a hard composite or plastic (not yarn-wrapped or rubber) xylophone-type of mallet (Figure 5). Even though a rock mallet will produce a good sound on a lithophone, use of a composite or plastic mallet is recommended for testing, if possible, so that new usewear markings are not unintentionally created on an artifact.
- 4) **Once the acoustical node locations are identified, the artifact should be placed on ropes or held or suspended at those locations (as described above), and when an appropriate mallet is found, the next step is to tap on the top surface of the artifact using a spring-like motion in your wrist.** There are three locations to tap on to test for acoustical properties: near either end or in the middle of the two acoustical nodes (see green arrow locations on Figure 1). If the artifact produces musical properties, you can also tap on the lateral edges in these same three locations and determine if the sound is the same, higher or lower than the top surface sounds. Do not tap on the acoustical node locations on either the top or lateral surfaces since the artifact is not resonant at these two nodal points (see the red X locations on Figure 1).
- 5) **If the artifact is a probable lithophone, the sounds should be similar to tapping on a wooden marimba, a metal xylophone, glass crystal, or a metal bell. If there is no ringing or musical sound, the artifact is likely not a lithophone.** Software apps, such as Pitch Analyzer and Tonal Energy Tuner, are easily-accessible and reasonably-priced tools that can be downloaded on cell phones, computers, or other devices and can be used to determine the specific acoustical characteristics (note, Hz, etc.) of sounds produced by lithophones.

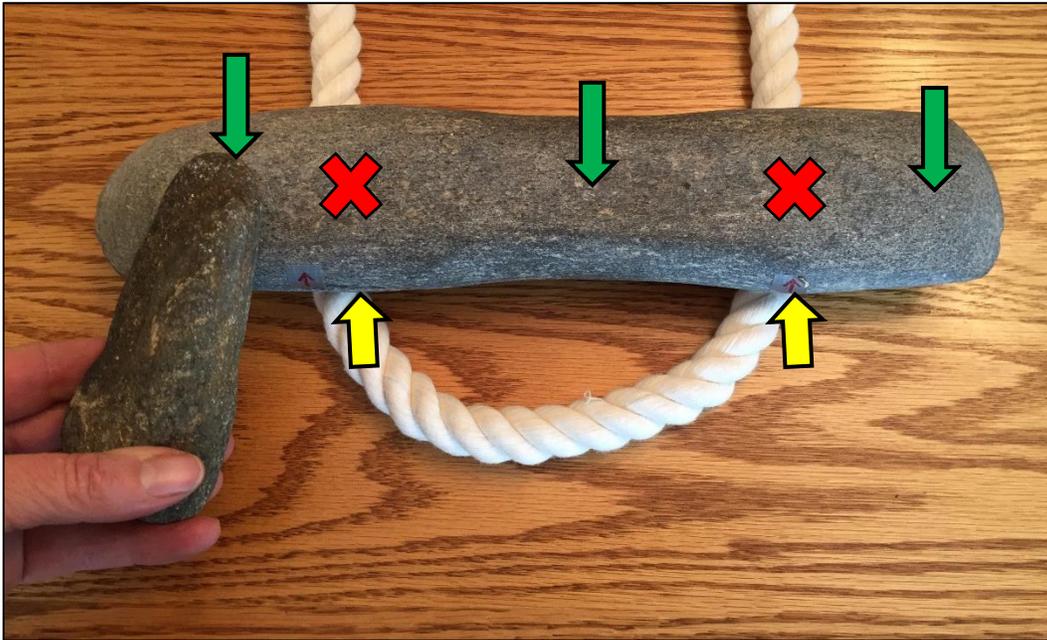


Figure 1. **How to test a potential lithophone in the field or lab using a natural elongated pebble.** The yellow arrows show the acoustical node/dull zone locations where the artifact should be supported above a flat surface or the ground, or where it should be held if testing in a vertical or horizontal position. The two red “X” marks are the locations not to tap (these areas are the dull zones), and the green arrows shows the best locations to tap the artifact to check for acoustical properties. Note: the artifact can also be rubbed along the length of the body to test for acoustical properties using friction. This sound is somewhat similar to tapping, but in general, friction produces a more rough and continuous musical sound instead a singular ringing note.



Figure 2. Testing a potential lithophone vertically by holding it at the point of the upper acoustical node (dull zone). The least amount of contact with the hand/fingers provides the most resonance.



Figure 3. Suspending a potential lithophone for testing horizontally. It is suspended by thin pieces of leather on the two acoustical nodes (dull zones) marked with white tape.



Figure 4. Mallets made of natural materials that can be used to test potential lithophones; left to right: rock, bone and antler.



Figure 5. Modern xylophone mallets made of hard plastic and composite materials that can be used to test potential lithophones.