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## Reconstruction of An Arkansas Hopewellian Panpipe

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### Abstract

Panpipes have been found in North America only on Hopewell sites. A particularly well preserved specimen from the Helena Crossing Site was described by James A. Ford. From this description a reconstruction which produced a true octave was made from native cane. Since the panpipe is a more primitive instrument than the flutes in use during Hopewell florescence, it is postulated that this instrument was used by shamans in the cult of ancestor worship.

Hopewellian burial mounds have yielded, since the first exploration in the mid-nineteenth century, artifacts made of a square or rectangular sheet of hammered metal, usually copper, folded over with the edges meeting and overlapping in the center of the back. The front of the sheet of metal is found to be corrugated to form two to five smooth, rounded ridges. At first these objects were considered ornaments; later when tubes of bone or reed were discovered intact inside, they were thought to be either joined whistles or torches. Recently they have come to be considered true panpipes, a musical instrument which seems to be unique in North America to the Hopewell culture. So exclusive is the panpipe to this culture, in fact, that it is considered a diagnostic trait.

The latest and best description of a Hopewellian panpipe is found in James A. Ford's 1963 report of the burial mounds at the Helena Crossing site at Helena, Ar-

kansas. The reeds and plugs of two of the tubes of this artifact were found intact. Even with Ford's exact description there is still some question as to whether or not these objects are actually panpipes. Several other questions concerning these artifacts also arise: If they are panpipes why do they occur isolated in space and time from all other examples of panpipes? What purpose did they serve in the Hopewell cult which made them unique to this culture? Perhaps these questions can be answered somewhat by an examination of the artifact itself.

The first artifact of this kind found by archeologists was probably the one from the Marietta, Ohio, mounds. It was a typical in that it was covered with a sheet of silver. The specimen was described and figured by Atwater in the *Transactions and Collections of the American Antiquarian Society* in 1820 and was said to have five tubular sections (Mills 1926: 265). It may have

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been the same artifact as the one found by Dr. Hildreth in a mound at Marietta and mistaken for part of a European sword scabbard (Willoughby 1922: 50). In the 1890's two copper artifacts were found by Clarence B. Moore during his survey of the St. Johns River area of the northwest coast of Florida. One artifact was described as "an ornament of Sheet copper bent over and repousse . . . length about 7 inches, width, about 2 inches" (Moore 1894: 507). This is definitely the kind of artifact later called a panpipe, but the second find was one somewhat flared on the ends with a hole bored through the center for suspension. It is impossible to tell from the drawing whether or not it is a panpipe, but it is corrugated as if to hold three tubes.

Moore found still another fluted example at the "mound near the Shell heap, Crystal River, Citrus County". He described it as "an ornament of fluted sheet copper, badly broken," and he added, "This pattern was a popular one among the aborigines" (Moore 1903: 412).

J. F. Snyder who was exploring the Baehr Mound Group in Brown County, Illinois, at the time when Moore was in Florida reported his own finds in the *American Anthropologist* of 1891. In Mound G he found a copper casing which he described as smooth and accurately corrugated as though pressed by machinery (Griffin 1941: 182). The next discovery seems to have been made by Warren K. Moorehead in 1922 when in the Hopewell mound group of Ohio he found several copper cylinders. He was able to determine that they once covered bone tubes, although these were badly decayed and all but one were in fragments (1922: 128).

Finally, Charles C. Willoughby recognized that the strange objects were some kind of musical instrument. Finding an example made from meteoric iron in the Turner group of earthworks in Hamilton County, Ohio, he compared it to similar artifacts in museums in Tennessee and Grand Rapids, Michigan. The Tennessee specimen had surrounded three tubes of cane or reed, fragments of which had been preserved by the copper salts. Willoughby speculated that all of the artifacts of this kind had once cased similar tubes. He concluded, "Perhaps the tubes may have been whistles of different notes joined together in a single instrument" (Willoughby 1922: 51).

W. C. Mills apparently did not agree with Willoughby, however, including a panpipe casing of the Hopewell, Ohio, artifacts under the heading "Problematical Copper Object" in his 1926 publication. He discusses the object, compares it with several others and concludes that "Their form suggests a flute-like musical instrument and the presence in some specimens of fibers, cane or reeds. is taken by some to indicate their use as torches, neither suggestion, however, appears to account satisfactorily for the purpose of the objects" (Mills 1926: 265).

In 1931, W. C. McKern gave a detailed description of a find in Mound 12 of the Schwert Group in the Trem-

peleau Focus of southwestern Wisconsin, and in 1945, Robert Ritzenthaler found one in an "Old Copper" site near Potosi in the same state.

Marvin Fowler may have been the first archeologist to call the conjoined tubes panpipes. In his 1957 report of the Rutherford Mound in Hardin County, Illinois, he said that "Burial 31 had on its chest a panpipe . . . 3¾ inches (95 mm.) long and 1⅞ inches (48 mm.) wide . . . made of sheet copper wrapped around three reeds, fragments of which were preserved" (Fowler 1957: 17).

Ford's excellent description must be quoted here as it served as the instructions from which I constructed my panpipe.

A set of copper-jacketed panpipes lay on the sternum of Burial 61. The copper jacket was badly corroded and quite fragile. It is 20.7 cm. long and 5.5 cm. wide and was made to hold three cane tubes approximately 1.3 cm. in diameter, side by side. On the side that may be referred to as the front of the instrument, the copper was bent into flutings to conform to the curves of three cane tubes. The jacket is flat on the reverse where the edges of the copper sheet were brought together and held by two cord ties that passed through holes in the sheet.

At the mouthpiece end only, on the front side of the instrument, the copper has been coated with a thin sheet of silver for a distance of 3.2 cm. from the end . . . The cane tubes have been preserved by copper oxide. They run the full length of the copper jacket and apparently did not extend beyond . . . The left-hand cane tube was wrapped for part of its length near the center with twisted bast-fiber string. Two layers of vegetable material, possibly the inner bark of some tree, had been wound over this in strips 3 mm. wide. This wrapping perhaps helped to secure the cane tube in the copper covering.

Usually in the making of panpipes of cane or bamboo the septum that closes the tube at each joint is utilized to control the length of the tube, but such is not the case with this instrument. The three cane tubes run the full length of the copper jacket, and no joints are visible. The right-hand tube has been plugged with a small stick for 11.5 cm. of its length, leaving an open tube 9.2 cm. long. The plug is a small twig of a variety of wood that has a pith center. It is about 3 mm. in diameter, wrapped with a two-ply yarn which,

in turn, is covered with a wrapping of ribbon-like strips about 3 mm. wide, probably the inner bark of some tree . . . The string is made of a bast fiber that cannot be identified with certainty.

No plug is visible in the central tube. A wooden plug in the left-hand tube extends to within 4.5 cm. of the end of the tube. Evidently this was the high note side of the panpipe.

Adhering to the upper side of the instrument as it lay on the chest of Burial 61, are fragments of bast-fiber-twined cloth preserved by the copper salts (Ford 1963: 16-17).

This detailed description aroused my interest in attempting a reconstruction. With all of the dimensions listed, I felt that I might construct an adequate duplicate of the cane tube part of the instrument. Accordingly, I set to work using a pocket knife with a serrated blade and a metric system ruler. I cut a stalk of wild cane from the bank of the White River and let it dry for two weeks. The cane was still green enough to work without splitting. Cutting several sections from the stalk, I was pleased to find that all of the sections near the center of the stalk were 1.3 cm. in diameter, giving me latitude to choose three tubes which produced pleasant tones before the septum was removed. I trimmed three smooth and fairly straight tubes which produced clear notes into 20.7 cm. lengths which did not contain a septum. This made the tubes completely hollow and open at both ends.

For a plug I used a shoot from a wild redbud tree. I had hoped to make some cedar bark string for wrapping the plugs, but, since it seemed like too ambitious an undertaking, I decided on carded cotton and two-ply jute twine. I felt that these two materials would adequately stop the air flow around the plug. Having wrapped the two plugs, 11.5 cm. and 16.2 cm. long respectively, with strips of cotton secured by the jute twine, I forced them into the hollows of two of the cane tubes. An extra wad of cotton was fixed at exactly 9.2 cm. in the right tube and 4.5 cm. in the left tube.

Although the tone quality was not as good as when the tubes were naturally stopped by the septum, the two artificially stopped tubes immediately produced tones when blown. The tube with the longer air column produced the lower note, an A flat one and one half octaves above middle C; the tube with the shorter air column produced an A flat one octave higher than the low note.

Since I was interested only in the musical aspect of the instrument, I did not try to cover the panpipe with metal, but bound the stopped tubes together with an unstopped middle tube in a ligature of split cane and twine. The resulting instrument is only a crude model of the original Hopewellian panpipe, but I believe it has the same dimensions and produces the same notes as

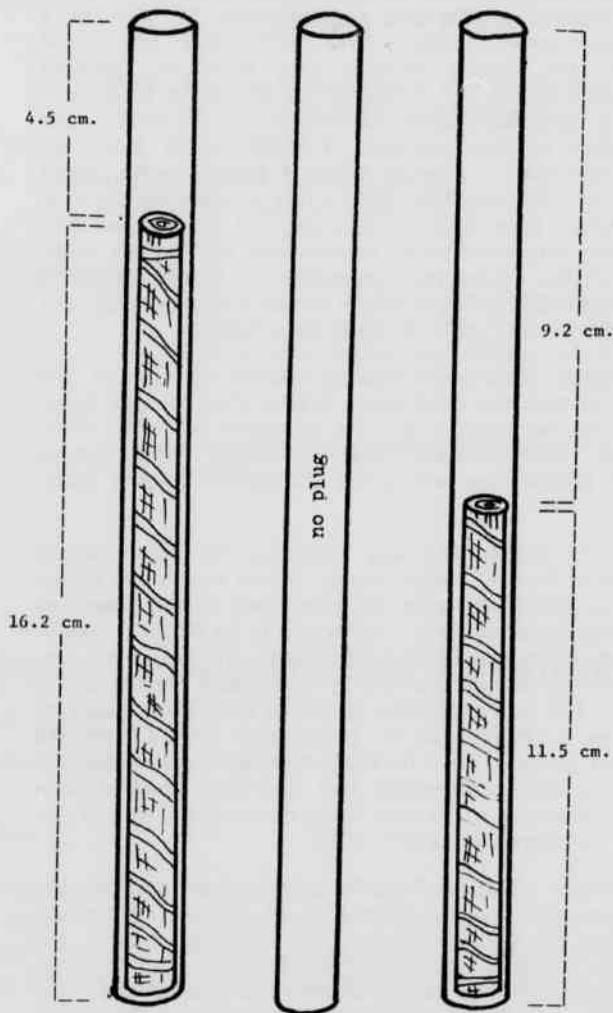


Figure 1. Diagram of a reconstruction of the panpipe found at the Helena Crossing site.

the resplendent original. Because a perfect octave was produced by the two stopped pipes, the artifact is, in my opinion, a panpipe even though it may have been used as an ornament in the burial.

If these are panpipes, then, why are they found in burials of the Hopewell culture, approximately between 500 B. C. and 1 A. D., and not in any other North American culture either before or after? The question is, in some measure, a part of the larger question of why Hopewell culture flourished at all. Willey and Phillips characterize the Hopewell phase as one in which "The technological skill and artistic sensitivity . . . were unapproached anywhere else in North America at that



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time and hardly surpassed in Middle and South America" (Willey and Phillips 1958: 158).

Because of the high level of attainment of the Hopewell, some writers have argued for outside influence — a new race of people practicing cranial deformation, agriculture, and elaborate mortuary ceremonies moving into the Ohio and Illinois valleys, either from the Caribbean through Florida and the Southeast, or from Central America via the Mississippi River with Poverty Point, Louisiana, as an early manifestation of the culture. The fact that panpipes do occur from the San Blas Islands off Panama southward today and are found occasionally made of ceramic material in prehistoric sites on the west coast of Mexico could lend some weight to this theory. While there is no evidence to rule out such a theory entirely, no early site has been found in the south which shows more incipient Hopewellian traits than the burial mound cultures like the Adena which were already present in the Illinois and Ohio regions before the Hopewell florescence.

The most likely theory seems to be the one most widely accepted today: that there was no intrusion of foreign peoples, but rather that the Hopewell phase grew out of the Early Woodland Burial Mound cultures of the Ohio and Illinois valleys. Maize agriculture, Woodland pottery techniques, a growing circle of trade networks, and a religion which emphasized the elaborate burial of certain individuals were synthesized to make up the Hopewell complex. Hopewell culture could not be called a civilization but, more probably, a cult presided over by shamans, superimposed on the existing band or tribal organization. William Sears sees the Hopewell social systems as based on kin rather than class because of the settlement pattern of small equalitarian villages. His statement that "dominant individuals in Hopewell burial mounds were probably shamans" (Sears 1954: 344) is backed by evidence of cremation and unadorned burial for most of the population. If we surmise that this ceremonial Cult of the Dead grew out of the worship of ancestors and that, as Sears believes, the grave goods such as panpipes, smoking or platform pipes, and ear spools were sacred or magical objects either traded widely or disseminated by "missionaries" of the cult, then the presence of the panpipes in the cult regalia can be explained.

The panpipe is the most simple tone-producing instrument. Excepting drums and rattles, it was one of the earliest instruments made by man. It is probably the instrument "referred to in Genesis called in Hebrew 'Ugab' and translated into the English version as 'organ'" (Miller 1932: 73). It is unthinkable that a people who lived along the banks of rivers where cane grows wild would not have known the principle of the panpipe without having to rely on recent diffusion for the idea. It is not unusual that no evidence of panpipes has been found in earlier cultures of the region. If the panpipes were not bound together in a set in the archaic cultures but used with a single pipe per individual musician as in

some West African societies, the single section of cane would not be recognized by archeologists as a musical instrument should one be preserved for thousands of years. Knowledge of the principle of the stopped pipe leads naturally to the more advanced concept of the whistle and fingered flute, instruments found in abundance in prehistoric American contexts. It would not be unlikely that an advanced, flute-playing society would think of the panpipe as an ancient, crude instrument used in bygone days by their first ancestors. A panpipe would, then, be a fitting object to accompany the spirit of a shaman to the realm of the ancestors, an object with which the ancestors would be familiar. The importance of grave goods in Hopewell culture seems to have placed a high premium on excellent craftsmanship, and the copper objects must have been once smooth and beautifully burnished. It was probably for the sake of beauty that the Hopewell artisans removed the bulky septa from the cane, leaving straight, uniform tubes to be covered with the thin sheet metal. The lack of tone quality was probably not important, as the panpipes were made expressly for the occasion and may never have been played. The middle tube of the Helena panpipe may never have had a plug in it, being purposely made incomplete like later ritual pottery fired after holes were cut out. If it had a plug, it may have been ritually "killed" at the time of the burial so the spirit of the panpipe might accompany the spirit of the dead.

As the Hopewell cult declined, the function of the panpipes disappeared, as did the objects themselves from burials. Although platform pipes and other sacred objects were assimilated into the encroaching Southern Cult, there was no place for an instrument of the ancestors in the Mesoamerican-patterned religion of Quetzalcoatl and the pantheon of high gods.

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# The Freshwater Algae of Arkansas

## II. New Additions

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### INTRODUCTION

This paper is the second in a series reporting the algal flora of Arkansas. A previous paper (Meyer, 1969) reviewed the published literature and recent additions to this little known flora. Thirty-two genera and 82 species or varieties are presented in this inventory. These include 24 Chlorophyceae, 4 Conjugatophyceae, 9 Xanthophyceae, 14 Chrysophyceae, 1 Bacillariophyceae, 5 Pyrrophyceae, 25 Euglenophyceae, 4 Cryptophyceae, 4 Cyanophyceae and 1 Rhodophyceae. Except for *Porphyrosiphon notarisii* (Menegh.) Kutz. et Gom.; each of these taxa have not previously been reported from the State of Arkansas. Daily (1958) noted that an Arkansas collection of this species is on deposit in the Chicago Natural History Museum.

Annotations accompanying each species gives a brief description of the habitat and subcommunity in which the organism was collected. The aquatic subcommunities described by Round (1965) are indicated in the text by letters. The subcommunities recognized include the eu-

plankton (P), neuston (N), epipelagic (EP), epilithic (EL), epiphytic (ET) and epizoid (EZ). Metaphyton (M) is used in the sense of Behre (1956) and refers to those algae, especially desmids and flagellates, which occur in close association with epiphytes but are not attached to them.

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Division Chlorophyta

Class Chlorophyceae

Order Volvocales

The nomenclature used within this order is that of Huber-Pestalozzi (1961).