1. MUSIC-ARCHAEOLOGICAL EVIDENCE

Shell trumpets were already known in the end of the Early Preclassic period of Mesoamerica (2000 to 1200 B.C.), as demonstrated by sound artefacts made of West Indian Chank shells (Turbinella angulata) excavated in burials of Tlatilco, Valley of Mexico\(^1\). Preserved specimens dating from the Classic (A.D. 150 to 900) and the Postclassic period (A.D. 900 to 1521), as well as additional information, in particular iconographical and ethnohistorical data, reveal an eventful history of the instrument in Mesoamerica. In the following paragraphs, the function and meaning of shell trumpets in Teotihuacan, the Classic Maya and the Late Postclassic Aztec culture will be discussed.

TEOTIHUACAN (150 B.C. TO A.D. 600/750)

In Teotihuacan shell trumpets were covered with an incised stucco layer of polychrome paint, as demonstrated by two preserved sound artefacts made of Panama Horse conches (Pleurolopa princeps) exhibited in the Museo Nacional de Antropología, Mexico City (Fig. 1)\(^2\). The decoration depicts a headdress consisting of a zigzag band in yellow and red with green feathers, and a double glyph at the body whorl consisting of two tassel headdresses with the numerical coefficients “9” and “12” indicated by bars and dots. The symbolic meaning of the double glyph is still unclear\(^3\). One trumpet of 36 cm in length dating from A.D. 500 was excavated near an altar of Tetitla, one of the many residential compounds of Teotihuacan. Several finds show that shell trumpets were also deposited in ceremonial burials, possibly as a personal item. One specimen made of a Florida Horse conch (Pleurolopa gigantea) without decoration was recently excavated in Burial 5 within the Pyramid of the Moon, dating from A.D. 350 (Fig. 3). The trumpet was unearthed next to a flaked obsidian figure and pointed towards the west, where the sun is going down into the underworld. Several objects of greenstone (jadeite) carved in Maya style indicate some form of contact between the ruling group of Teotihuacan and Maya royal families.

A ceramic trumpet in the shape of a shell of 28 cm in length was unearthed in Burial 32 of the Tetitla compound, dating from A.D. 400–450 (Fig. 2)\(^4\). While this is the only instrument of this

\(^1\) García Moll et al. 1991; Patricia Ochoa 2002: pers. communication.
\(^2\) Séjourné 1957, 138 fig. 51; Caso 1959 pl. 2; Martí 1970, 42–43 fig. 23.
\(^3\) Glyphs with numerical coefficients are extremely rare in Teotihuacan. Another prominent example is a stone stela excavated in a tomb of the Oaxaca Barrio showing the Zapotec glyph for “movement” and the number “9” in relief (Millon 1973 vol. I, 41–42 figs. 60a,b). It may represent the “calendrical name of the principal occupant of the tomb”, as suggested by Millon (1973 vol. I, description of fig. 62b).
\(^4\) Séjourné 1966, 228, 231 pl. 107 fig. 121; Rattray 1997, 157.

One of the reasons why these instruments were produced may have been a difficulty in obtaining marine shells (Stevenson 1968, 34; Montagu 1981, 276). The conceptual implications of transforming the shell into a ceramic object are stressed by José Pérez de Arce (n. d.).
kind found so far in Teotihuacan, a quantity of ceramic shell trumpet imitations (skeuomorphs) has been found in West Mexico\(^6\).

The ceremonial significance of shell trumpets in Teotihuacan is emphasized by the prominent role that they play in relief and mural art. A number of preserved depictions indicate that mouthpieces were added to the instrument, supposedly ceramic objects similar to the embouchures of modern brass instruments\(^6\). However, circular ear-spool made of stone could have been used as well (Fig. 4). The mouthpieces were probably attached with beeswax or gum resin glue, and allowed a more precise playing technique (see addendum).

In addition, the Teotihuacan iconography shows that shell trumpets were adorned with long green feathers representing the iridescent tail plumes of the sacred Quetzal Bird (*Pharomacrus mocinno*). The precious feathers were obtained by long distance trade reaching as far as the Maya highlands of present-day Chiapas and Guatemala, and may have been attached with glue at the tip and the anterior (siphonal) canal of the shell (Fig. 5). The feather decoration probably represents the crest and tail of a supernatural bird. Indeed, in a set of preserved mural paintings of the Tetitla compound shell trumpets are depicted as completely transformed into birds, supposedly representing King vultures (*Sarcoramphus papa*). An anthropomorphic manifestation of this shell trumpet being may be depicted in murals of the White Patio of the Atetelco compound, showing human figures with bird-headaddresses emerging from the bells of the instruments\(^8\).

At the Temple of the Plumed Conches, a substructure of the Jaguar compound located near the great plaza of the Pyramid of the Moon, four pairs of shell trumpets with mouthpieces and feather decoration are depicted in monumental stone reliefs to the left and right of the entrance (Fig. 6)\(^9\). It can be assumed that the structure was an important sanctuary dedicated to the trumpet. In associated reliefs flowers of four petals are depicted below the entrance of the Jaguar compound, a superimposed structure of the Temple of the Plumed Conches, demonstrating that shell trumpets were played in processions dedicated to the so-called Storm God, a deity associated with the planet Venus. In alternating sequence with tassel headdresses, he is depicted in the half-star symbol similar to the cross-section of a shell\(^14\). Below the panel are four jaguar priests depicted as felines with feather headdresses and conch necklaces playing shell trumpets in a procession (Figs. 8-9). Each figure holds an instrument in its left paw, from which three drops of a precious liquid, such as water or blood, are falling down.

The use of shell trumpets in ritual human sacrifice is indicated by the mural ensemble of the White Patio of the Atetelco compound, showing priests carrying shell trumpets under their arms, priests dancing in a courtyard with sacrificial

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\(^6\) Martí 1971, 17. Similar objects have also been found in West Mexico (Dájer 1995, 61 photo 96), at Monte Albán (Caso et al. 1967, 376 fig. 315b.c), and in Veracruz (Martí 1970, 90 fig. 75; Coe/Diéhl 1980, 286 fig. 404).

\(^7\) Séjourné 1966, 278 fig. 161.


\(^9\) Séjourné 1966, 125 fig. 54.

\(^10\) Kubler 1967 figs. 4–5.

\(^11\) Pasztory 1974, 11. From the mouth of the goddess and the shell trumpets emerge identical sound-scrolls, suggesting that the trumpet’s sound was perceived to be her voice.

\(^12\) Séjourné 1966 fig. 142.

\(^13\) De la Fuente 1995 vol. I, 103–107 pl. 2.

\(^14\) Pasztory 1974, 8–10.
knives in their hands, and a procession of felines devouring human hearts\textsuperscript{15}.

**THE CLASSICAL MAYA CULTURE**
*(A.D. 150 TO 900)*

In the Maya culture shell trumpets were made predominantly from Florida Horse conches (*Pleuroplaca gigantea*) and decorated with incised circular symbols and glyphs with cinnabar tracings. Some excavated specimens show one or two finger holes allowing pitch to be fixed precisely (see addendum). Additionally, small holes at the siphonal canal and the lip were drilled as a means of suspending the instrument from the neck or arm.

A preserved shell trumpet of 29.3 cm in length dating from A.D. 250–400 shows the incised portrait of a figure with headdress, supposedly representing a ruler or ancestor called by the instrument in the course of the vision quest\textsuperscript{16}. The hieroglyphic inscription designates him as the owner of the trumpet, suggesting that its ownership afforded high status.

Another preserved specimen of 21.5 cm in length dating from A.D. 300–500 represents *Uc-Zip*, the Maya deity of the shell trumpet related to the hunt in the Postclassic period (Fig. 10)\textsuperscript{17}. While the body of the shell forms his head and headdress, his nose is formed by one of the spines and the right eye is represented by one of the finger holes. The second finger hole is held by an incised figure sitting on a throne in the centre of the moon sign. According to the glyptic inscription, the figure is named *Balam-U-Xib* or *Balam-U-Ahau*, "Jaguar Moon Lord", supposedly representing one of the Twin Brothers mentioned in the *Popul Vuh*, who became the moon after defeating the Lords of the Underworld\textsuperscript{18}.

*Uc-Zip* may be related to a figure with deer attributes playing the shell trumpet as a companion of *Och-Chan*, the Bearded Dragon, a vision serpent related to the ancestral world called in autosacrificial rites\textsuperscript{19}. As a mediator between the underworld and earth, this trumpet player was also depicted emerging from the jaws of the vision serpent (Fig. 11), accompanied by Ways (animal spirits) shown in a dancing posture\textsuperscript{20}. On a carved vase he is depicted with a torch and a necklace with an inverted jar pendant, probably representing the *Akbal* glyph for darkness\textsuperscript{21}.

A set of vase paintings indicates that shell trumpets were closely related to God N, one of the toothless old gods inhabiting the upper water level of the underworld, and, as a manifestation of a *Bacab* (sky bearer), identified with the four cosmic directions\textsuperscript{22}. In one particular example he is depicted emerging from the mouth of a feathered shell, demonstrating a similarity to the typical Teotihuacan decoration of the instrument\textsuperscript{23}.

On a vase from the Chamá Valley area, Guatemala, God N is shown as being pulled out of the shell and sacrificed, probably by one of the Twin Brothers mentioned in the *Popul Vuh* (Fig. 12)\textsuperscript{24}. According to myth, with this act the Lords of the Underworld were defeated and the creation of humankind made possible\textsuperscript{25}. As suggested by a Panama Horse conch of 36.5 cm in length with an irregular perforation at the parietal wall, shell trumpets were ritually killed and then offered\textsuperscript{26}. To open the shell and extract a branch with a sacrificial knife of stone may have symbolized killing God N and reliving the mythological act of creation.

The close association of the instrument with autosacrificial rites is shown in a vase depiction of a shell trumpet and two large tubular trumpets played simultaneously in a bloodletting rite performed at the court\textsuperscript{27}. Another vase depiction of polychrome paint represents a naked shell trumpet player with a perforated penis, playing in the presence of spear-carrying warriors and their captives in a rite of victory\textsuperscript{28}. The conceptual analogy, which probably had been made between war and the hunt, is demonstrated by depictions of suc-

\textsuperscript{15} De la Fuente 1995 vol. I, 207–212; 220 figs. 18.4–18.7 pl. 12.

\textsuperscript{16} Schele/Miller 1986, 83–84 pl. 27a.

\textsuperscript{17} Schele/Miller 1986, 308–309 pl. 121.

\textsuperscript{18} Schele/Miller 1986, 309 (see Popul Vuh 1971, 144).

\textsuperscript{19} Robicsek/Hales 1981, 123; Schele/Miller 1986, 308 pl. 120.


\textsuperscript{22} Schele/Miller 1986, 54.

\textsuperscript{23} Hellmuth 1987, 306 fig. 692. Juxtaposed with a representation of insects and birds, two feathered shells with sound-scrolls are also found on a preserved vase of the Altun Ha style (Reents-Budet 1994, 198–199 fig. 5.43). A close affinity of this shell trumpet depiction is found in representations of the Principal Bird God (Coe 1978, 118–123).

\textsuperscript{24} Coe 1978, 70–75; Reents-Budet 1994, 276–279 fig. 6.50.

\textsuperscript{25} Popul Vuh 1971, 134–145.

\textsuperscript{26} The trumpet was found with an undamaged specimen and other musical instruments in Tomb A-I of Mound A in Kaminaljuyu, Guatemala (Kidder et al. 1946, 46–51 fig. 17, 162b; Martí 1970, 120). Similar damage is found on a shell trumpet excavated in Offering 1 of Building Y at Monte Alban, Valley of Oaxaca (Caso et al. 1967, 116; 119 fig. 76). It should be noted that damage to the parietal wall cannot be the result of killing the edible snail, which can withdraw itself deep enough.

\textsuperscript{27} Eggebrecht et al. 1993, 143 fig. 92. The tubular trumpets are similar to those shown in the famous murals of Bonampak, Chiapas.

\textsuperscript{28} Kerr 1989–1997 vol. I, 57. Behind this figure are shown two musicians playing a rattle and a ceramic drum with what appears to be long reed flutes.
cessful hunters sounding shell trumpets in processions when bringing home their prey\textsuperscript{29}.

THE AZTEC CULTURE (A.D. 1325 TO 1521)

Two shell trumpets made of Queen conches (\textit{Strombus gigas}) were deposited in offerings dedicated to the Great Temple of Tenochtitlan, excavated in the historical centre of Mexico City\textsuperscript{30}. One specimen of 24.5 cm in length was found in Offering 88 (A.D. 1469–1481) in front of the eastern façade of the temple (Fig. 15). It was spatially associated with a \textit{Tlaloc} brazier representing the Aztec rain and fertility deity built on the first terrace of the structure. The other trumpet of 28.2 cm in length was deposited in the centre of Offering 87 (A.D. 1481–1502), unearthed at the platform in front of the stairways to the sanctuary of \textit{Huitzilopochtli}, the solar deity associated with war. Unlike the preserved shell trumpets of the Classic period, the specimens do not show any sign of decoration or organological modification. Both instruments were excavated along with objects associated with water, the earth and the underworld, such as a crocodile skull in Offering 88, greenstone figures and copper alloy bells in Offering 87, and with material related to sacrificial rites, such as human skulls, autosacrificial bones and sacrificial knives\textsuperscript{31}.

Apart from sound artefacts, a monumental votive sculpture made from volcanic stone representing a Queen conch with perforated apex was located on an altar excavated about 50 meters east of the Great Temple (Fig. 16)\textsuperscript{32}. The sculpture emphasizes the importance of shell trumpets in Aztec ceremonialism, as no other votive representation of a musical instrument was represented in that size. Votive objects representing shell trumpets \textit{en miniature} have been excavated in several deposits, as in Offering H of the Skull Rack Altar north of the Great Temple (A.D. 1486–1502), including two ceramic representations with remains of blue paint and a representation made from greenstone\textsuperscript{33}. Finds from Teotihuacan and Monte Albán show that representations of shell trumpets and other musical instruments were already manufactured in the Classic period\textsuperscript{34}.

The omnipresent association of the instrument with fertility and the mythological origin of life is expressed by a beautiful ceramic representation found in Offering 58 (A.D. 1469–1481), showing the representation of a cradle inside the shell (Fig. 17). This unique votive object recalls the Aztec cosmogony, relating that the shell trumpet was produced in the underworld by \textit{Quetzalcoatl} – a deity associated with creation, the defied wind (\textit{Ehecatl}) and the planet Venus (\textit{Tlabnizcalpantecuhtli})\textsuperscript{35}. According to myth, the seashell first belonged to \textit{Mictlanteucuhtli}, the “Lord of the Underworld”. On the condition that \textit{Quetzalcoatl} could produce a sound from the shell, \textit{Mictlanteucuhtli} would allow him to take the bones of the previous world age, which, mingled with the sacrificial blood of the gods, served to produce the humans of the fifth world age called \textit{nahui ollin} (“four-movement”). By means of his magic power and with the help of insects, \textit{Quetzalcoatl} managed to hollow out the shell and was able to blow the primordial blast heralding the creation of humankind\textsuperscript{36}.

A part of the myth indicates that \textit{Quetzalcoatl} had to play the shell trumpet in a prescribed manner, as he is asked to “carry something [i.e. the musical instrument or the sound] four times in all directions around the precious circular greenstone [i.e. the centre of the world]” (\textit{nauhpia xictlayahualochti in chalciuhuiteyahualco})\textsuperscript{37}. It can be suggested that this metaphor represents a mythological explanation that the trumpet had to be played towards the four cardinal points and the centre of the world to obtain a positive result of the ritual.

As ethnohistorical information indicates, several sanctuaries were dedicated to the shell trumpet, reminiscent of the Temple of the Plumed Conches unearthed in Teotihuacan. Thus, a group of priests instructed the novices in the musical practice of playing shell trumpets in the temple of the goddess \textit{Tlazolteotl} related to conception and birth\textsuperscript{38}. Another important temple was the tecciz-
Shell Trumpets in Mesoamerica

SYNTHESIS

Shell trumpets were highly valued ceremonial instruments in Mesoamerica. The powerful sound made them perfect signal instruments, for instance, to announce victory or ritual sacrifice. While mouthpieces were set to the instruments in the Classic period, as in Teotihuacan, or finger holes drilled, as in the Maya culture, among the Aztecs the instruments were not organologically modified. This data reflects different playing techniques performed in different cultures. The symbolic decoration of the instruments also varied considerably.

On the other hand, important conceptual similarities are evident. For instance, shell trumpets were intimately related to water, particularly the sea considered to be the origin of life. A strong association with the aquatic underworld and the creation of humankind is present in the Maya as well the Aztec cosmogony. Playing a mayor role in numerous priestly activities, the instruments were believed to be a means of audible communication with the supernatural realm, able to call specific deities or the spirits of the ancestors. Shell trumpets itself were deified, and deities were believed to live in the shell. Moreover, a relationship between musical practice, numerical symbolism and cosmovision is evident.

2. LIVING TRADITIONS

Shell trumpets are still played by contemporary ethnic groups in Mexico. Among these are the Huichol (Wixárika) and the Maya-Lacandon (Hach Winik), which historically have never been in contact with each other. However, a number of comparable aspects of the recent use of shell trumpets indicate that prehispanic musical traditions may have survived in both.

The Huichol are an ethnic group comprising of a population of approximately 20,000. They are dry farmers inhabiting a mountain range of the Sierra Madre Occidental of Nayarit and Jalisco, Mexico, with mesas of 2,500 m altitude and deep barrancas (Fig. A). Both the Huichol language and the Nahuatl spoken by the Aztecs in Late Postclassic Mesoamerica belong to the Uto-Aztecan language family.

The Lacandon represent a small ethnic group of a population of approximately 700 to 800 speaking a Maya dialect. They are agriculturalists inhabiting the tropical forest of eastern Chiapas, Mexico, at an altitude of 500 to 1200 m (Fig. A).

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38 Sahagún 1950–1982 Part III [Book 2], 172–173. The analogy, which has been made between uterus and vagina and the shell as universal symbols for reproduction, is made evident by the association with this Aztec deity (see Jackson 1917, xvi; xviii; Sachs 1940, 50).
40 Codex Borgia 1974, 4; 8.
41 Sahagún 1950–1981 Part III [Book 2], 76.
42 Acosta 1940, 239.
43 Sahagún 1950–1981 Part XII [Book 11], 2. It should be noted that the roar of felines can be imitated on a shell trumpet by breathing and gurgling through the instrument.
44 Durán 1984 vol. II, 376 pl. 34.
46 Sahagún 1950–1981 Part III [Book 2], 77 fig. 22.
47 Sahagún 1950–1981 Part III [Book 2], 181–182 fig. 60; Part II [Book 1], 7 fig. 28; Sahagún 1974, 50 pl. 3 fig. 12 (see Suárez Díez 1989, 140).
48 Díaz del Castillo 1960 vol. I, 114; 395; 484.
HUICHOL (WIXÁRIKA)

In 1898 Carl Lumholtz observed the Huichol sowing ceremony “tamales de maíz crudo” (Namawita Neixa) hold at the time of the summer solstice shortly before the rainy season starts: “When the heap of tamales is dedicated to the gods by the shamans, some of the people are appointed to blow into such shells five times in the daytime and five times at night. This is done as a signal to all the gods. After the feast the shells are carried to Mesa del Nayarit, where they remain through the wet season, to be afterwards brought back again for the next feast of the same kind. They are kept in Mesa del Nayarit in a god-house. According to tradition, the Chichimecas brought them first from the part of the coast where San Blas is today”49.

This fascinating account demonstrates that the shell trumpet, called ku’ra, must be played in a ceremony five times in the course of the day and five times at night for the ceremony to be effective. The sound is of a transcendent meaning, calling the gods to join a ceremony held at the time when summer rainfall is most needed. On the other hand, the instrument is kept far away from the fields during the rainy season, probably to prevent too much rain. Obviously, a strong evocative power is attributed to it.

Believed to be brought from San Blas at the Pacific coast, a mythological place of the Huichol goddess Tatei Kievimukwa, who takes the western rains to the fields, the shell trumpet is closely associated with the sea and agricultural fertility. Lumholtz, who came into possession of a trumpet made of a Murex (Phyllonotus) radix specimen guarded as a sacred object in the sanctuary of the sun in Teaka’ta, recorded that the trumpet is considered to be a “valuable prayer for life”, while the natural markings of the shell, probably the spines and the spire cords, symbolize “grains of corn and water”50.

According to recent investigation, the symbol of the spiral made evident by the cross-section of the shell (see Fig. 18. 19) refers to the wind, specifically to the deity Nia’ariwame, the “Rain Serpent”51. This concept shows great similarities to prehispanic traditions, as the shell pectoral, the “jewel of the wind” (ebecacozcatl), was considered to be the powerful sign of Quetzalcoatl and related deities associated with the wind and the planet Venus52. Among the Huichol, a Peyoter (peyote pilgrim) considered to embody the god of wind Tamatsi Eaka Teiwari for five years, takes charge of the shell trumpet as one of his attributes53. He blows it to invite the deities to join the sowing ceremony. This is done after a bull is sacrificed and a ceremonial stick with burning flowers is directed to the five world directions. Simultaneously other Peyoteros play cow-horns (awate), as already documented in a photograph published in 195554.

LACANDON (HACH WINIK)

In 1907, Alfred M. Tozzer observed a use of the Lacandon shell trumpet (ba ech) made of Queen conches (Strombus gigas) in the important renewal rite of the incense burners55. He stated that before the ritual feeding of the defied burners and the ceremonial drum (k’ayom) with a ritual drink is carried out, the leader of the ceremony “goes to the eastward of the hut and blows five long blasts on the conch shell, thus calling the gods to come in person”56. To complete the ritual, the trumpet was played once more in the same manner57.

This account demonstrates the evocative power of the shell trumpet’s sound, similar to that attributed to it by the Huichol. Its use in the renewal rite, where it gives life to the sacred incense burners and the ceremonial drum, indicates a close relation to creation and cyclical regeneration. To obtain a positive result of the ritual, five blasts have to be made.

According to recent investigation, the shell trumpet is considered to be a “male instrument” and should be guarded in the sanctuary out of the sight of women, probably to conserve its power58. Furthermore, it is played towards the cardinal points, specifically to call the deities. In comparison, five blasts are played one after another by the Lacandon, while the shell trumpet is played five times in the course of the day and five times at night by the Huichol. Cosmovision and numerical symbolism is reflected in the musical practice of both ethnic groups by four blasts directed to the four cardinal points, while the fifth blast is dedicated to the spiritual centre of the world.

CONCLUSION

The function and meaning of shell trumpets demonstrate a number of common features over the course of two millennia. While some aspects changed repeatedly, for instance the decoration and organological modification, a number of basic ritual functions remained apparently untouched.

49 Lumholtz 1900, 185.
50 Lumholtz 1900, 185 fig. 253.
51 Neurath 2002: pers. communication.
52 See Corona Nuñez 1966.
54 Martí 1955, 56.
55 Tozzer 1907, 119–120.
56 Tozzer 1907, 119.
57 Tozzer 1907, 120.
58 Ochoa Cabrera et al. 1998, 77–78.
by cultural changes and could have survived from prehispanic times to the present. One of the most important concepts shared in each of the cultures is the shell trumpet’s function as a sacred instrument associated with water, fertility and creation. It is always guarded in sanctuaries and played by expert religious leaders in important ceremonies, in which the shell trumpet’s powerful sound is capable of reaching the spiritual realm. The fact that the Huichol and the Lacandon have had no contact, but assign a similar conceptual meaning to the shell trumpet demonstrates a strong continuity of cultural knowledge communicated by musical practice, in which cosmovision and numerical symbolism is a recurring element.

ADDENDUM

ON THE ORGANOLOGY AND ACOUSTICS OF SHELL TRUMPETS

Natural trumpets or horns made from the shells of sea snails (marine gastropods) are among the oldest lip-vibrating aerophones. European cave finds date from the final Neolithic period (3000 to 2500 B.C.) and end-blown shell trumpets are manufactured by separating the tip of the spire (apex) by cutting or sanding, thus revealing the inner structure of the shell, and knocking out the nuclear section of the spiral column (columella) with a blow from a pointed object. A Caribbean technique to obtain the edible snail can help to explain a possible origin of the manufacture of end-blown trumpets, as the top of the spire is simply broken of.

The resulting embouchure has the diameter of a wide cup mouthpiece without a constricted passage. It links up directly with the channel of the snail, a coiled tube in the shape of an equiangular spiral expanding logarithmically towards the mouth of the shell (Fig. 18. 19). In a tube of perfect conical form waves of all frequencies reach the bell before being reflected, equally if it is coiled or not. X-rays of a Panama Horse conch (Fig. 20) show that Horse conches demonstrate this principle nearly as perfect as Triton Trumpet shells (Charonia tritonis) used as side-blown instruments in Oceania and as end-blown trumpets with mouthpiece in Japan. X-rays of a Queen conch (Fig. 21) demonstrate an inner structure with a different shape, resulting in wave reflections with some frequencies accentuated and others not.

The timbre of shell trumpets depends significantly on the size of the shell. Large specimens produce a deep drone, which can be heard over long distances. When several trumpets of different size are played simultaneously, the perfect series of harmonics produced by one instrument may result in slow periodic amplitude vibrations (beats), with oscillating intensity.

Pitch can be raised about an octave by changing the position of the lips and the air pressure, and lowered variably by inserting the hand into the bell, thus diminishing its diameter and cutting down the total sound output. By moving the hand, flutter and “wa-wa” effects can be produced. Fixed pitches can be achieved by finger holes drilled into the shell, which, besides of the Maya culture, also is reported from the Fiji Island, Oceania. Usually, long signal blasts are produced and the whole range of tonal possibilities and playing techniques is not used.

Fitting a mouthpiece to the instrument with a constricted passage and a cup narrower than the blowing hole of the shell allows for a better attack, as less physical strength is needed and the lip-vibration can be controlled better. In addition to the probable ceramic and stone embouchures used in Mesoamerica, shell trumpet mouthpieces were also made from bone, wood or cane, gum resin with turquoise inlays, as unearthed in Pueblo Bonito, Southwest USA, or copper, as in the Moche culture, Peru. Mouthpieces made of silver are used in Tibet. In Japan, sophisticated shell trumpet mouthpieces are made of brass or stainless steel.

While wind sounds can be produced by breathing through the trumpet and gurgling sounds by shaking a shell filled with water, the instrument can also be used as a megaphone and voice distorter by breathing, speaking or singing through the blowing hole, supposedly one of the oldest techniques of using the shell.

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59 Among other terms used for “shell trumpet” are “conch trumpet”, “conch shell trumpet” and “conch horn”. It should be noted that the term “conch” is biologically not correct, as the instrument is produced from the shell of marine snails.

60 Clodoré 2002, 51–52 fig. 17.

61 Furst 1966, 96. The mollusc can also be killed by a blow between the spines at one of the first sutures of the spire, which may help to explain the origin of the manufacture of side-blown shell trumpets.


66 Montagú 1981, 274.

67 Suárez Díez (n. d.); Pepper 1909, 240 fig. 6; Donnan 1978, 63 fig. 99.


69 Fukui 1994, 54–55 pl. VIa fig. 1.

70 Sachs 1940, 48.
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Fig. A  Map showing sites and regions mentioned in the text.
Fig. 1  Panama Horse conch (*Pleurolopa princeps*). Length 36 cm. Tetitla, Teotihuacan (c. A.D. 500). Museo Nacional de Antropología, Mexico City.

Fig. 3  Florida Horse conch (*Pleurolopa gigantea*). Burial 5, Pyramid of the Moon, Teotihuacan (c. A.D. 350). Photo: Saburo Sugiyama/Arizona State University.

Fig. 2  Ceramic shell trumpet imitation (skeuomorph). Length 28 cm. Tetitla, Teotihuacan (c. A.D. 400–450). Museo Nacional de Antropología, Mexico City.

Fig. 4  Shell trumpet made of a Panama Horse conch with earspool of stone (1.7 x 2.9 cm) attached with beeswax. Experimental model.
Fig. 5  Suggested decoration of the feathered shell trumpet, Teotihuacan.

Fig. 6  Temple of the Plumed Conches, Teotihuacan (c. A.D. 200). Reconstruction drawing.
Fig. 7  Shell trumpets framing Tlaloc A. Mural of Tetitla, Teotihuacan (c. A.D. 250–400).

Fig. 8  Jaguar playing the shell trumpet. Mural of the Palace of the Butterflies, Teotihuacan (c. A.D. 450–700).

Fig. 9  Murals of the Palace of the Butterflies, Teotihuacan (c. A.D. 450–700).
Fig. 10  Shell trumpet representing *Uc-Zip*. Length 21.5 cm. Classic period (c. A.D. 300–500).

Fig. 11  *Och-Chan* and figure with deer attributes playing the shell trumpet. Vase painting. Classic period.

Fig. 12  God N is pulled out of the shell and sacrificed. Vase painting. Classic period.
Fig. 13  Shell trumpet player with Queen conch (*Strombus gigas*). *Codex Magliabechiano*, Fol. 35r (portion). Early Colonial (16th century). Biblioteca nazionale centrale di Firenze.

Fig. 14  *Tecciztecatl*, Aztec deity of the moon emerging out of the shell. *Codex Borgia*, p. 8 (portion). Preconquest (before 1521). Biblioteca Apostolica Vaticana, Rome.

Fig. 15  Queen conch (*Strombus gigas*). Length 24.5 cm. Offering 88, Aztec Templo Mayor, Tenochtitlan (A.D. 1469–1481). Museo del Sitio del Templo Mayor. Photo: Germán Zuñiga Amézquita.
Fig. 16  Monumental shell trumpet representation of a Queen conch made of andesite. 87 x 74.5 x 44 cm. Patio Exterior, Aztec Templo Mayor, Tenochtitlan (c. A.D. 1325–1521). Museo del Sitio del Templo Mayor. Photo: Salvador Guilliem Arroyo.

Fig. 17  Ceramic shell trumpet representation showing cradle. Length 19 cm. Offering 58, Aztec Templo Mayor, Tenochtitlan (A.D. 1469–1481). Museo del Sitio del Templo Mayor. Photo: Germán Zuñiga Amézquita.
Fig. 18  CT made of a *Pleuroloca princeps* specimen. Length 34.5 cm.

Fig. 20  X-ray made of a *Pleuroloca princeps* specimen. Length 34.5 cm.

Fig. 19  CT made of a *Strombus gigas* specimen. Length 28 cm.

Fig. 21  X-ray made of a *Strombus gigas* specimen. Length 28 cm.