

Ocarina

The **ocarina** is an ancient wind musical instrument—a type of vessel flute.^[1] Variations exist, but a typical ocarina is an enclosed space with four to twelve finger holes and a mouthpiece that projects from the body. It is traditionally made from clay or ceramic, but other materials are also used—such as plastic, wood, glass, metal, or bone.

Contents

History

Types

Gallery

Musical performance

Tone production/acoustics

Musical notation and tablature

Similar instruments

Cultural references

See also

References

Further reading

External links

Ocarina



A mono-chamber 12-hole ocarina

Classification	Wind, Woodwind, Aerophone
Hornbostel	421.221.42
–Sachs classification	(Vessel flute with duct and fingerholes)
Related instruments	
Xun, Huaca, Slide whistle, Tin whistle, Molinukai	

History



Giuseppe Donati, Italian inventor of the modern ocarina, with his work

The ocarina belongs to a very old family of instruments, believed to date back over 12,000 years.^[2] Ocarina-type instruments have been of particular importance in Chinese and Mesoamerican cultures. For the Chinese, the instrument played an important role in their long history of song and dance. The ocarina has similar features to the Xun (埙), another important Chinese instrument (but is different in that Ocarina uses an internal duct, whereas Xun is blown across the outer edge).^[3] In Japan, the traditional ocarina is known as the *tsuchibue* (kanji: 土笛; literally "earthen flute"). Different expeditions to Mesoamerica, including the one conducted by Cortés, resulted in the introduction of the ocarina to the courts of Europe. Both the Mayans and Aztecs produced versions of the ocarina, but it was the Aztecs who brought Europe the song and dance that accompanied the ocarina. The ocarina went on to become popular in European communities as a toy instrument.^[1]

One of the oldest ocarinas found in Europe is from Runik, Kosovo. The ocarina is a Neolithic flute-like wind instrument and was named Runik Ocarina, the earliest prehistoric musical instrument ever recorded in Kosovo.^[4] The modern European ocarina dates back to the 19th century, when Giuseppe Donati from Budrio, a town near Bologna, Italy transformed the

ocarina from a toy, which only played a few notes, into a more comprehensive instrument (known as the first "classical" ocarinas). The word *ocarina* in the Bolognese dialect of the Emiliano-Romagnolo language means "little goose." The earlier form was known in Europe as a gemshorn, which was made from animal horns of the chamois (Dutch: *gems*).

Hungarian-Austrian composer György Ligeti called for four ocarinas (to be performed by woodwind players doubling their own instruments) in his Violin Concerto, completed in 1993. The Polish composer Krzysztof Penderecki incorporated 12 ocarinas in his composition *The Dream of Jacob* from 1974 and 50 of them in the final section of his Symphony No. 8, completed in 2008, where they are meant to be played by members of the choir.



Ocarina, author reported, c. 1900, Museu de la Música de Barcelona

In 1998, the ocarina was prominently featured in the Nintendo 64 video game *The Legend of Zelda: Ocarina of Time*,^[5] attracting a marked increase in interest and a dramatic rise in sales of the instrument.^[6] It was not the first time an ocarina was featured in *The Legend of Zelda* series, with the first appearance being as the "Magic Flute" in 1991's *The Legend of Zelda: A Link to the Past*, and then as the "Ocarina" in 1993's *The Legend of Zelda: Link's Awakening*.^[1]

The instrument also appears in a few other video games, including *Evolution Worlds*, *Star Ocean: First Departure*, the *Scribblenauts* series,^[7] and, more recently, *Angry Birds Evolution*.^{[8][9]}

Types

There are many different styles of ocarinas varying in shape and the number of holes:

- *Transverse (Sweet potato)* – This is the best known style of ocarina. It has a rounded shape and is held with two hands horizontally. Depending on the number of holes, the player opens one more hole than the previous note to ascend in pitch. The two most common transverse ocarinas are 10-hole (invented by Giuseppe Donati in Italy) and 12-hole.
- *Pendants*
 - *English Pendant* – These are usually very small and portable, and use an English fingering system (4–6 holes).
 - *Peruvian Pendant* – Dating from the time of the Incas, used as instruments for festivals, rituals and ceremonies. They are often seen with designs of animals. They usually have 8–9 holes.
- *Inline* – These are often called a "fusion" of the pendant and transverse ocarinas. This style is known for being very small and compact, with more holes than the pendant. This allows one to ascend in pitch with the linear finger pattern rather than finger combinations.
- *Multi-chambered ocarinas (better known as "double" and "triple" ocarinas)* – exist within the three broad categories of ocarina. These ocarinas overcome the ocarina's usual limited range of notes. A transverse double ocarina typically plays two octaves plus a major second, and a transverse triple ocarina plays with a range about two octaves plus a fifth. Double ocarinas for pendant and inline ocarinas also exist. Double inline ocarinas are specially designed to play chords, for harmonic playing.

Several makers have produced ocarinas with keys, mostly experimentally, beginning in the late 19th century. Keys and slides either expand the instrument's range, help fingers reach holes that are widely spaced, or play notes not in the native key of the instrument.^[10]

Gallery



A transverse ocarina



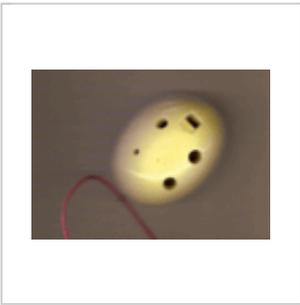
Meissen "Blue Onion" pattern porcelain transverse ocarina, early 20th century



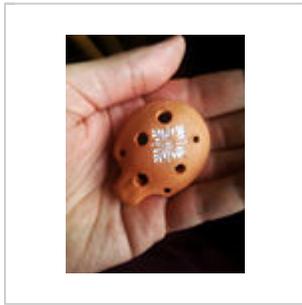
Front and back view of transverse ocarinas. The double holes on front indicate a fingering system developed in 20th-century Japan.



Metal transverse ocarina of 1875



The English pendant ocarina, invented in the 1960s by John Taylor, produces an entire octave using just four finger holes



English pendant ocarina (unstrung, with two suspension holes)



An inline ocarina.



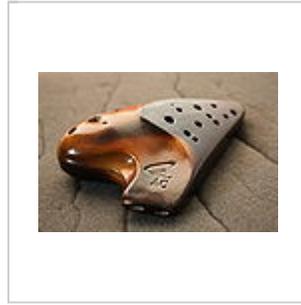
A double-chambered inline ocarina



A double-chambered English pendant



A double-chambered transverse ocarina (mouthpiece on the side)



An Asian double chambered ocarina. The two blow holes in the mouthpiece are clearly visible, which makes it possible for the player to play an extended range of notes (17 in total, in this case from A4 to C6)



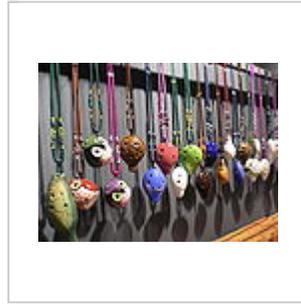
A triple-chambered ocarina in the bass register



A collection of ocarinas



Selection of novelty "teacup" ocarinas that are also functional teacups



Owl-shaped ocarinas on sale in a shop in Taiwan.



Ocarina made from a bottle



A ceramic pre-Columbian ocarina, ca. 1300-1500, Tairona people, Sierra Nevada de Santa Marta, Colombia

Musical performance

Tone production/acoustics

How an ocarina works:

1. Air enters through the windway
2. Air strikes the labium, producing sound
3. Air pulses in and out of the ocarina, as the vessel resonates a specific pitch (see Helmholtz resonator)
4. Covering holes lowers the pitch; uncovering holes raises the pitch
5. Blowing more softly lowers the pitch; blowing harder raises it. Breath force can change the pitch by three semitones.^[11] This is why ocarinas generally have no tuning mechanism or dynamic range, and why it is hard to learn to play one in tune.

The airstream is directed on the labium by a fipple or internal duct, which is a narrowing rectangular slot in the mouthpiece, rather than relying on the player's lips as in a transverse flute. Like other flutes, the airstream alternates quickly between the inner and outer face of the labium as the pressure in the ocarina chamber oscillates.

At first the sound is a broad-spectrum "noise" (i.e. "chiff"), but those frequencies that are identical with the fundamental frequency of the resonating chamber (which depends on the fingering), are selectively amplified. A Helmholtz resonating chamber is unusually selective in amplifying a single frequency. Most resonators also amplify more overtones.^[12] As a result, ocarinas and other vessel flutes have a distinctive overtoneless sound.

Unlike many flutes, ocarinas do not rely on pipe length to produce a particular tone. Instead the tone is dependent on the ratio of the total surface area of opened holes to the total cubic volume enclosed by the instrument.^[13] This means that, unlike a flute or recorder, sound is created by resonance of the entire cavity and the placement of the holes on an ocarina is largely irrelevant – their size is the most important factor. Instruments that have toneholes close to the voicing/embouchure should be avoided, however; as an ocarina is a Helmholtz resonator, this weakens tonal production.

The resonator in the ocarina can create overtones, but because of the common "egg" shape, these overtones are many octaves above the keynote scale.^[14] In similar Helmholtz resonator instruments with a narrow cone shape, like the Gemshorn or Tonette, some partial overtones are available. The technique of overblowing to get a range of higher pitched notes is possible with the ocarina but not widely used because the resulting note is not "clean" enough, so the range of pitches available is limited to a 12th.

Some ocarina makers increase the range by designing double- or triple-chambered ocarinas (sometimes simply referred to as double or triple ocarinas) tuned an octave or a tenth apart although some double ocarinas are not made to increase the range, but to play in harmony with the other chambers.. These double and triple ocarinas can also play chords.

Musical notation and tablature

Ocarina music is written in three main ways. The most apparent is the use of sheet music. There are archives of sheet music either specifically written for ocarinas, or adapted from piano sheet music. Since some ocarinas are fully chromatic and can be played in professional musical situations, including classical and folk, sheet music is an ideal notation for ocarinas.

Second is the use of numerical tablature, which expresses the musical notes as numbers. Some makers have developed their own system of numerical tablature for their ocarinas, while others follow a more universal system where numbers correspond to different notes on the scale. This method is typically used by beginners who have not learned to read sheet music.

A third method uses a pictorial tablature similar to the ocarina's finger hole pattern, with blackened holes that represent holes to cover. The tablature represents the holes on the top of the ocarina, and, where necessary, the holes on the underside. This enables easy playing, particularly for beginners. The two most popular tabulature systems are:

- The John Taylor four-hole system (invented in 1964 by British mathematician John Taylor)
- The 10 hole sweet potato system (invented by Giuseppe Donati of Budrio Italy)

Depending on the artist, some may write a number or figure over the picture to depict how many beats to hold the note.^[15]

Similar instruments

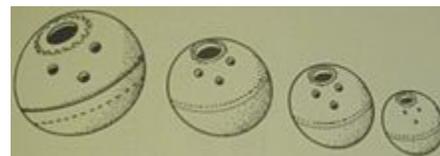
Other vessel flutes include the Chinese xun and African globe flutes. The xun (simplified Chinese: 埙; traditional: 埙; pinyin: xūn) is a Chinese vessel flute made of clay or ceramic. It is one of the oldest Chinese instruments. Shaped like an egg, it differs from the ocarina in being side-blown, like the Western concert flute, rather than having a recorder-like mouthpiece (a fipple or beak). Similar instruments exist in Korea (the hun) and Japan (the tsuchibue).^[16]

A related family of instruments is the closed-pipe family, which includes the panpipes and other instruments that produce their tone by vibrating a column of air within a stopped cylinder.

The old fashioned jug band jug also has similar properties.

The traditional German gemshorn works nearly the same way as an ocarina. The only difference is the material it is made from: the horn of a chamois, goat, or other suitable animal.^[16]

The borrindo is a simple hollow clay ball with three to four fingering holes, one hole slightly larger than the other three, which are smaller and of equal size to one another. The holes are arranged in an isosceles triangular form. The borrindo is made out of soft alluvial clay available in plenty everywhere in the central Indus Valley. Being of the simplest design, it is made even by children. Some adults make fine borrindos of larger size, put pottery designs on them, and bake them. These baked borrindos, with pottery designs, are the later evolved forms of this musical instrument, which appears to have previously been used in its simple unbaked form for a long time. The sound notes are produced by blowing somewhat horizontally into the larger hole. Finger tips are placed on smaller holes to regulate the notes. Its ease of play makes it popular among children and the youth.



Sindhi borrindos, a form of vessel flute produced in different sizes to give different tones. The borrindo is made out of soft alluvial clay, plentiful in the central Indus Valley.

Cultural references

The 1950 Broadway musical Call Me Madam has a song about "The Ocarina."^[17]

The titular legendary Ocarina of Time (and the wooden Fairy Ocarina) feature prominently in The Legend of Zelda: Ocarina of Time, an adventure game released in 1998 on the Nintendo 64. A major game mechanic, used for quick-travel and in puzzles, is that the player can at any time pull out their ocarina and play song snippets that they have been taught. If performed correctly, the song then plays and can have an in-game effect. While the in-game songs use only five controller buttons, the control stick and shoulder buttons alter the pitch such that the player can access a full octave-and-a-half chromatic scale, and add vibrato.^[18] The game was credited with increasing sales of ocarinas.^[19]

See also

- [Nancy Rumbel](#)
- [Hand flute](#)
- [Vessel flute](#)

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External links

- A variety of ocarina fingering charts (<http://www.stlocarina.com/booklets.html>)

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