

1: Ben Franklin's inventions: glass armonica

The glass armonica was one of the most celebrated instruments of the 18th century. Franklin began to take his beloved armonica with him when he traveled and played popular Scottish tunes or original compositions for his audiences.

Tweet Ben Franklin playing his invention Photo via: Have you ever learned how to make a sound by running your finger along the rim of a wine glass? As a kid, I was pretty impressed with a few of my relatives who could work together to make a sort of song. The glass armonica is a large scale, mechanical method of playing the rims of many wine glasses. Benjamin Franklin invented the glass armonica in after attending a glass harp concert performance in England. The glass harp is an arrangement of wine glasses filled with various amounts of water. The more water in the glass, the lower the tone. Franklin was enthralled by the sound of the glass harp, but thought the tuning process and the effort it took to move from glass to glass was far too cumbersome. Therefore, he came up with a better system with practically the same sound: The size of bowls range from a shot glass highest tone to a moderate mixing bowl lowest tone. The spindle is attached to a foot pedal to allow the operator to spin the glass. Players must keep their fingers wet to produce sound, so they place small bowls of water between them and the instrument for frequent re-wetting. The glass armonica was never a widely used instrument, although it gained enough popularity to interest composers Mozart and Beethoven. Each composer wrote pieces specifically for the glass armonica. Since there was no good way to amplify the instrument in the 18th century, popularity declined as symphony orchestras and concert halls became prominent in the world of music. Some believed that players contracted lead poisoning from the coating of the glass bowls. The notes are laid out similar to a piano, but the technique is much more challenging. The instruments are also rare, so they are not widely available for people to use. And William Zeitler, a modern glass armonica player, seems perfectly happy in his Ben Franklin-impersonator garb. Take that, Friedrich Rochlitz. If you happen to have a wide array of wine glasses and glass dishes at your holiday gatherings, try making your own version of a glass armonica!

2: Harmonica - Wikipedia

The glass harmonica, also known as the glass armonica, glass harmonium, bowl organ, hydrocrystalophone, or simply the armonica or harmonica (derived from ἁρμονία, harmonia, the Greek word for harmony), is a type of musical instrument that uses a series of glass bowls or goblets graduated in size to produce musical tones by means of.

The Glass Harmonica became so popular that composers like Mozart and Beethoven wrote musical compositions for it. What is Glass Harmonica? The word Armonica is derived from the Greek word harmionia meaning harmony. The instrument is also called as harmonica because of its capability to produce multiple sounds that are pleasing to hear. The Glass Armonica use a series of glass bowls of different sizes that produce sounds of different frequencies when subjected to friction. Hence these type of musical instruments is also classified as a friction idiophones. You may also call this musical instrument with other names like the glass harmonica, glass harmonium, bowl organ, hydrocrystalophone, or simply the armonica or harmonica. What are other musical instruments with similar names? A Glass Harp is generally a collection of different sized wine glasses filled with a liquid medium that generates sound by means of the friction on the rims of the glasses. The Harmonica on the other side is your regular mouth organ that creates harmonious sounds. Unlike Glass Armonica that generates sounds using friction mechanism, the Harmonica is powered by air pressure. Also, the Mouth Organ was invented some 60 years after the invention of Glass Armonica. How was the idea of Glass Armonica conceived? Benjamin Franklin invented the first mechanical model of the musical instrument in 1761. It is also believed that the Glass Armonica was first musical instrument ever invented by the American national. Famous for his several inventions, Benjamin Franklin was also known for his passion for music. The idea of creating a glass armonica came to his mind in after he saw Edmund Delaval a musician performing with the glasses in England. Since he was an inventor, he thought of giving the design a twist and built a newer design that could actually produce sweet tones. This design was apparently the complete musical instrument that could play fuller tones and could also be used as an accompaniment for singing. How Benjamin Franklin describes the musical instrument after its invention? Benjamin Franklin wrote about the instrument he invented in one of his letters to a friend sent from London. The letter describes the musical instruments in following lines in his letter. In honour of your musical language, I have borrowed from it the name of this instrument, calling it the Armonica. The original armonica can be seen at the Franklin Institute in Philadelphia. Musicians who wrote the music for Glass Harmonica On account of its popularity, several composers started writing music for glass harmonica. Mozart wrote a musical piece for glass harmonica that is included in his collection of musical work titled as K. Beethoven experimented with the instrument in a melodrama in 1802. The instrument started losing its popularity during 18th century based on rumors that playing and listening to glass harmonica affects the mental health in a bad way. The side effects were often compared to depression and melancholic mood. Thanks for reading my 30th article in the series day music blogging challenge. Stay tuned for more informative articles. An artist, blogger, musician and digital marketing professional dedicated to sharing musing and stories about music, art and mindful resonance! Follow me [bharatpc](#) View all posts by [Bharat Share](#).

3: History of the Armonica, Ben Franklin and Glass Armonica

The armonica made quite a hit, particularly in Germany. Mozart was introduced to it by Franz Mesmer, who used his to 'mesmerize' his patients, and later Mozart wrote two works for it (a solo armonica piece, and a larger quintet for armonica, flute, oboe, viola and cello).

If you are irritated or disturbed by bad news, by friends or even by disappointment from a lady, abstain from playing, it would only increase your disturbance". The glass armonica was accused of causing evils such as nervous problems, domestic squabbles, premature deliveries, fatal disorders, and animal convulsions. The instrument was even banned from one German town by the police for ruining the health of people and disturbing public order a child died during a concert. Franz Anton Mesmer, a Vienna doctor known for his experiments He was forced to leave Vienna after a blind pianist, Marie Paradies, recovered her sight but to the detriment of her mental health. Rumours of this kind contributed to the death of the Armonica, which in had been considered "the fashionable accessory of parlours and drawing-rooms". The increasing intensity of the sound of orchestras deterred musicians from using a fragile instrument with such a delicate sound. Yet, there were two outstanding exceptions. In Donizetti used it in his opera Lucia di Lammermoor in the mad scene, in which the glass harmonica was soon replaced by two flutes the part recorded here is the original version, crossed out on the manuscript and Richard Strauss wrote for it in the last act of his opera Die Frau ohne Schatten, first staged in Vienna in 1903. The process is completed for tuning by dipping the bowls in hydrofluoric acid to adjust their thickness. The bowls were ground and tuned with an emery grind-wheel. As the depth of a bowl decreases, the pitch becomes higher. Sometimes, the seven colours of the rainbow were used to symbolize the seven diatonic degrees, with black figuring for the inflected notes. Finkenbeiner and his associate use transparent glass, with gold for the rims of the bowls corresponding to the black keys of a keyboard, as Roellig did in the eighteenth century. The glasses start vibrating according to a relaxation principle: This creates a series of impulses which set the bowl into vibration. The phenomenon is complex, so the master glass-blower needs the greatest skill to give the instrument its own character. A number of parameters can play a part, modifying the tone, the mode and the harmonic composition of the bowls. Thus, two bowls giving the same note will have different timbres according to the materials used, their shape, their thickness, their dimensions, and any hidden defects. It is said that sounds and noises are closely related to each period of time. It would be interesting to know what brought about the revival of the glass harmonica at the end of the twentieth century and the passion it has aroused, simply the result, perhaps, of new demands from musicologists and performers seeking authenticity. Can you not hear a celestial harmony? Felix Carrasco Thomas Bloch plays J. Today, the composers are re-discovering it and use it in various styles: Cantata Il trionfo della musica glassh.

4: Ben Franklin The Musician, Glass Armonica, Benjamin Franklin Music Invention

The Armonica, also called the glass harmonica was invented by Benjamin Franklin in 1761, while in England he attended a concert given on the wine glasses. He thought it was the sweetest sound he had ever heard but he wanted to hear more harmonies with his melody.

Public Domain What is it? The glass harmonica, or "armonica", is a beautifully steampunky spinning instrument made from glass bowls and played with the fingertips. The origins of the armonica date back to the mids, and the most famous version was dreamed-up by no less a luminary than Benjamin Franklin. Thomas Bloch uses a glass harmonica alongside his ondes martenot in *Monkey: Journey to the West*. Yet again, Korn return to stink up this column, using an armonica on four of their abominations, including an unplugged cover of Creep. Listen to it, if you must, on Spotify. The most famous armonica players? That would be Marie Antoinette and George Washington. How does it work? Lightly touching the rims of the bowls with fingertips that have been dabbed in water and chalk makes the spinning bowls "sing". The bowls were colour-coded to correspond to pitch – purple for B, orange for D, etc. Where does it come from? Franklin had seen musicians in England playing an arrangement of wine glasses filled with varying amounts of water. After some experimentation with the water method, Ben came up with his spinning one in 1761. The real advantage of this method was that, with the bowls positioned horizontally, the player could play the armonica like a piano, playing up to ten notes at the same time if required. Why is it classic? It sounds exactly like the noise glass would make if it could sing. Of the modern glass harmonica virtuosos, William Zeitler is the most well-known, and how beautiful is his *Venus: The Sphere of Love*? Five facts and things The first musician credited with playing glasses as an instrument is Irishman Richard Puckeridge, who wowed Georgian London with his performances of wine goblets filled with water. The amount of water in the goblet determines the pitch of the note - produced by running a fingertip around the lip of the glass. Well, "glass harmonica" is a catch-all term for any instrument involving the rubbing of glass, with the "harmonica" part derived from the Italian word for harmony. Armonica de verre, glasharmonika and – fabulously – hydrodaktulopsychicharmonica, are the French, German and Greek handles, respectively. If you are suffering from any nervous disorder, you should not play it; if you are not yet ill you should not play it; if you are feeling melancholy you should not play it. Sounds above 4, hertz apparently can be "triangulated", or located in space, by our ears, whereas our brains are unable to work out whether sounds below hertz are coming from the left or right. The armonica typically spins out tones that fall between 4 and 1000 hertz, tricking our brains into never being quite sure where or what the sound is coming from. Originally released in 1761, but quickly banned by the state, The Glass Harmonica uses the creation of a celestial instrument as an allegory for how capital will always corrupt creativity and the populace, even within a communist state.

5: GLASS HARMONICA **** THOMAS BLOCH the instrument : videos, pictures, works, facts

The glass armonica is truly one of the strangest musical instruments in the world. Invented by founding father Benjamin Franklin, the concept is the same as rubbing the tip of your finger around a wine glass to make a sound.

This is on the large side as armonicas go these days. The glasses are far enough apart that I can only reach a minor 6th in each hand at best. In the bass end C5 and below the glasses are a little farther apart so a perfect 5th is as wide as I can reach reliably. That said, multiple glasses in each hand are natural to the armonica and sound terrific. Playing the piano involves pushing down a lever. Consider using hand-over-hand if you want a scale. Notes can be sustained as long as the player can keep their fingers applied to the glasses. Sustained high notes above C6 or so? The higher glasses C5 and up? Violins are more facile than double basses. The glasses continue to ring after you release them. This effect is most pronounced in the bass end, much less apparent in the high end. Like the harp, where the high notes die away quickly, but the bass notes ring for a long time. There is no practical way to damp an armonica glass how do you noiselessly damp a spinning glass? This does not change the pitch – the pitch of a glass which is in essence a glass bell is fixed; moving the finger from side to side works by manipulating the overtones. The armonica definitely has dynamics, but the whole instrument is on the quiet side so its dynamic range is not large. Think of its dynamic range as ranging from ppp to p. I invariably amplify the armonica at performances – even just a little tasteful amplification makes a huge difference. Notation Write glass armonica music on a grand staff, or if the part is simple enough a single staff is fine. Below that the result is more like a pitchless thud. Unlike the lovely effect on the harp. Think about doing the wet-finger-around-the-wineglass: The result is uninteresting a barely audible pitched thud and I dare not risk breaking any glasses. Also, the glasses are too close together to bow them with a violin bow.

6: Glass harmonica - Wikipedia

Composer William Zeitler plays a glass armonica, invented by Benjamin Franklin in For more on this fascinating story read the full article here on the.

Here are answers to some frequently asked questions about our namesake, Benjamin Franklin. When was Benjamin Franklin born? His birthplace is at 17 Milk Street. Josiah Franklin was born in Northamptonshire, England, in , and came to the Colonies in He worked as a candle and soap maker in Boston. Abiah Folger was from Nantucket, Massachusetts. Did Benjamin Franklin have any siblings? Benjamin Franklin had 16 siblings. His father, Josiah, had seven children with his first wife, Anne Child, and 10 more with Abiah Folger. Where did Benjamin Franklin go to school? After less than a year, for financial reasons, Ben transferred to Mr. He stayed at the new school until he was ten, doing well in writing and badly in arithmetic. He then left school to work with his father in their candle shop. What did Benjamin Franklin want to be when he grew up? From his school days on, Benjamin Franklin wanted to be a sailor. His father did not approve, because an older son, Josiah, had gone to sea and never returned. Ben continued this learning in Philadelphia and England and eventually set up his own printing business in Philadelphia. Was Benjamin Franklin a Quaker? Benjamin Franklin was not a Quaker. In Philadelphia, he occasionally worshiped at Christ Church, the Church of England parish established in colonial Philadelphia in and later reorganized into the Protestant Episcopal Church in the United States of America. Did Benjamin Franklin get married? Her first husband had abandoned her and disappeared, so she was not able to get a divorce and officially remarry. She died of a stroke in and is buried next to Ben in the cemetery of Christ Church. Did Benjamin Franklin have children? Benjamin Franklin had three children. William, born around , was his illegitimate son with an unknown woman. He was raised by Ben and his wife, Deborah. He remained loyal to the British crown and became royal governor of New Jersey. He died of smallpox at age four. She married and had seven children. Did Benjamin Franklin have grandchildren? Benjamin Franklin had eight grandchildren. His son William had one son, William Temple Franklin. And daughter Sarah Franklin Bache had seven children: Where did Benjamin Franklin live as an adult? What did Benjamin Franklin look like? Strongly built, rounded like a swimmer or a wrestler, not angular like a runner, he was five feet nine or ten inches tall, with a large head and square, deft hands. His hair was blond or light brown, his eyes grey, full, and steady, his mouth wide and humorous with a pointed upper lip. His clothing was as clean as it was plain. Though he and others say he was hesitant in speech, he was prompt in action. Before becoming involved with politics, Benjamin Franklin owned a printing shop in Philadelphia. Though he retired from printing in , he continued to receive profits from the shop. He also served as postmaster of Philadelphia and co-deputy postmaster of British North America. In , he became the first postmaster general of the United States. What did Benjamin Franklin invent? An avid swimmer, Ben developed early swim fins. As a boy, he fashioned two oval wooden palettes with thumb holes. With one on each hand, he paddled through water, observing that they helped him to swim faster. He later developed swim fins to reduce what he called a "laborious and fatiguing operation. In , Ben invented the Franklin stove, an iron furnace that allowed people to heat their homes safely while using less wood. He loved to read and grew tired of switching between two pairs of glassesâ€”one that helped him to see things close, another to see things farther away. So he cut the lenses from both pairs in half, then put half of each lens in a single frame, inventing bifocals. What publications did Benjamin Franklin author? In his lifetime, Benjamin Franklin authored several works. His posthumously published autobiography, the first of its kind to achieve popularity, was written from to Did Benjamin Franklin really fly a kite in a thunderstorm? Yes, according to Franklin himself. In , he tied a key to a kite string and took it outside during a thunderstorm. His goal was to prove that lightning was a form of electricity. Which institutions did Benjamin Franklin found? What countries did Benjamin Franklin visit? Benjamin Franklin made several international journeys during his lifetime. England, to continue training as a printer England, acting as London representative of the Pennsylvania Assembly England, to Craven Street, London Benjamin Franklin was a member of many learned societies. Among these were the Royal Society of London, which in awarded him its prestigious Copley Medal for his work in

electricity, and the American Philosophical Society, of which he was a founder. He received several honorary degrees, including a doctorate from St. Which political documents did Benjamin Franklin sign? Benjamin Franklin stands alone as the only person to have signed all four of the documents that helped to create the United States: In addition, he helped to write parts of the Declaration of Independence and the Constitution. Benjamin Franklin enjoyed close personal and professional relationships with quite a few of the important European thinkers of his day, such as David Hume, Joseph Priestley, Antoine-Laurent Lavoisier, and the Marquis de Condorcet. What did Benjamin Franklin eat? Ben decided to become a vegetarian when he was 16 years old. He prepared his own meals, and mentions eating boiled potatoes, rice, hasty pudding, bread, raisins, and water. Quickly finishing his simple meals gave Ben more time for reading. He later gave up vegetarianism; during the voyage from Boston to Philadelphia he ate fish. Did Benjamin Franklin have a dog? Someone writing to Franklin comments that "nothing shall tempt me to forget your Newfoundland Dog. It indicates that a Madame De Boulainvilliers returned the dog to Franklin; it seems the dog had strayed. Was Benjamin Franklin musical? Benjamin Franklin played several musical instruments, including the violin, harp, and guitar. He also composed a quartet and built his own glass armonica. This simple instrument was played by touching the edge of the spinning glass with dampened fingers. In a letter to his daughter, Benjamin Franklin wrote: He is a bird of bad moral character. He does not get his Living honestly. You may have seen him perched on some dead tree near the river, where, too lazy to fish for himself, he watches the labor of the Fishing Hawk; and when that diligent Bird has at length taken a fish, and is bearing it to his nest for the support of his mate and young ones, the Eagle pursues him and takes it from him. Besides he is a rank coward: The little King Bird not bigger than a Sparrow attacks him boldly and drives him out of the district. He is therefore by no means a proper emblem for the brave and honest Cincinnati of America who have driven all the King birds from our country I am on this account not displeased that the figure is not known as a Eagle, but looks more like a Turkey. For the truth the Turkey is in comparison a much more respectable bird, and withal a true original native of America. Benjamin Franklin died at age 84 on April 17, , in Philadelphia, Pennsylvania. He was born an Englishman and died an American. The cause of death was complications from pleurisy. Where is Benjamin Franklin buried? Benjamin Franklin is buried in the cemetery of Christ Church, Philadelphia, next to his wife, Deborah. Is Benjamin Franklin on any American money?

Videos. Videos featuring the glass armonica found on YouTube. (Every player with a video on YouTube has at least one below.) Carolinn Skyler Glass Armonica.

A piece played almost entirely on a glass harmonica. Problems playing this file? European monarchs indulged in playing it, and even Marie Antoinette took lessons as a child from Franz Anton Mesmer. The music for the ballet Othello by American composer Elliot Goldenthal opens and closes with the glass harmonica. Some claim this was due to strange rumors that using the instrument caused both musicians and their listeners to go mad. It is a matter of conjecture how pervasive that belief was; all the commonly cited examples of this rumor seem to be German, if not confined to Vienna. One example of alleged effects from playing the glass harmonica was noted by a German musicologist Johann Friedrich Rochlitz in the *Allgemeine musikalische Zeitung*: If you are suffering from any nervous disorder you should not play it. If you are not yet ill you should not play it excessively. If you are feeling melancholy you should not play it or else play uplifting pieces. After touring for many years in duo performances with her celebrated vocalist sister, she was also said to have been afflicted with a melancholia attributed to the plaintive tones of the instrument. For a time the armonica achieved a genuine vogue, but like most fads, that for the armonica eventually passed. It has been claimed the sound-producing mechanism did not generate sufficient power to fill the large halls that were becoming home to modern stringed instruments, brass, woodwinds, and percussion. That the instrument was made with glass, and subject to easy breakage, perhaps did not help either. A modern version of the "purported dangers" claims that players suffered lead poisoning because armonicas were made of lead glass. However, there is no known scientific basis for the theory that merely touching lead glass can cause lead poisoning. Lead poisoning was common in the 18th and early 19th centuries for both armonica players and non-players alike; doctors prescribed lead compounds for a long list of ailments, and lead or lead oxide was used as a food preservative and in cookware and eating utensils. Above 4 kHz people primarily use the loudness of the sound to differentiate between left and right ears and thus triangulate, or locate the source. The full quotation, written in a letter to Giambattista Beccaria, an Italian priest and electrician, is: In a smaller room and an audience less numerous, the effect must be enchanting. Though the accompaniments were kept very much under, they were still occasionally too loud. Music for glass harmonica was all-but-unknown from until the 18th century although Gaetano Donizetti intended for the aria "Il dolce suono" from his opera Lucia di Lammermoor to be accompanied by a glass armonica, and Richard Strauss specified use of the instrument in his opera *Die Frau ohne Schatten*, when German virtuoso Bruno Hoffmann began revitalizing interest in his individual goblet instrument version that he named the glass harp for his stunning performances. Playing his "glass harp" with Eisch manufactured custom designed glasses mounted in a case designed with underlying resonance chamber he transcribed or rearranged much of the literature written for the mechanized instrument, and commissioned contemporary composers to write new pieces for his goblet version. Finkenbeiner's in The historical instruments with gold bands indicated the equivalent of the black keys on the piano, simplifying the multi-hued painted bowl rims with white accidentals as specified by Franklin. The Cristal di Baschet differs mainly from the other glass instruments in that the identical length and thickness glass rods are set horizontally, and attach to the tuned metal stems that have added metal blocks for increasing resonance. The result is a fully acoustic instrument, and impressive amplification obtained using fiberglass or metal cones fixed on wood and by a tall cut-out multi-resonant metal part in the shape of a flame. Some thin added metallic wires resembling cat whiskers are placed under the instrument, supposedly to increase the sound power of high-pitched frequencies. Dennis James recorded an album of all glass music, *Cristal: The Wrath of Khan*.

8: The Glass Armonica - Benjamin Franklin's Magical Musical Invention

The glass armonica is a musical instrument invented by Benjamin Franklin in It works on the wet finger around the wine glass idea. Very popular in Europe, even Mozart and Beethoven composed for it.

C E Each hole is the same interval here, a perfect fifth from its key of C counterpart; on the diatonic scale, a G is a perfect fifth from C. The interval between keys can be used to find the note layout of any standard diatonic. This provides a unique wavering or warbling sound created by the two reeds being slightly out of tune with each other and the difference in their subsequent waveforms interacting with each other its beat. The Asian version, which can produce all 12 semitones, is used often in East Asian rock and pop music. Orchestral harmonicas are primarily designed for use in ensemble playing. Orchestral melody harmonica[edit] There are eight kinds of orchestral melody harmonica; the most common are the horn harmonicas often found in East Asia. These consist of a single large comb with blow-only reed-plates on the top and bottom. Each reed sits inside a single cell in the comb. One version mimics the layout of a piano or mallet instrument, with the natural notes of a C diatonic scale in the lower reed plate and the sharps and flats in the upper reed plate in groups of two and three holes with gaps in between like the black keys of a piano. Horn harmonicas are available in several pitch ranges, with the lowest pitched starting two octaves below middle C and the highest beginning on middle C itself; they usually cover a two- or three-octave range. They are chromatic instruments and are usually played in an East Asian harmonica orchestra instead of the " push-button " chromatic harmonica that is more common in the European and American tradition. Their reeds are often larger, and the enclosing "horn" gives them a different timbre, so that they often function in place of a brass section. In the past, they were referred to as horn harmonicas. The other type of orchestral melodic harmonica is the polyphonia, though some are marked "chromatica". These have all twelve chromatic notes laid out on the same row. In most cases, they have both blow and draw of the same tone, though the No. Chord harmonica[edit] The chord harmonica has up to 48 chords: It is laid out in four-note clusters, each sounding a different chord on inhaling or exhaling. Typically each hole has two reeds for each note, tuned to one octave of each other. However, less expensive models often have only one reed per note. Quite a few orchestra harmonicas are also designed to serve as both bass and chord harmonica, with bass notes next to chord groupings. There are also other chord harmonicas, such as the Chordomonica which operates similar to a chromatic harmonica , and the junior chord harmonicas which typically provide six chords. The first three holes play a major chord on blow and draw, with and without the slide. Holes 2, 3, and 4 play a diminished chord; holes 3, 4, and 5 play a minor chord; and holes 4, 5, and 6 play an augmented, for a total of sixteen chords. This pattern is repeated starting on hole 5, a whole step higher; and again starting on hole 9, for a total of 48 chords. ChengGong harmonica[edit] The ChengGong harmonica [2] has a main body, and a sliding mouthpiece. The body is a hole diatonic harmonica that ranges from B2 to D6 covering 3 octaves. Its hole mouthpiece can slide along the front of the harmonica, which gives numerous chord choices and voicings seven triads, three 6th chords, seven 7th chords, and seven 9th chords, for a total of 24 chords. As well, it is capable of playing single-note melodies and double stops over a range of three diatonic octaves. Unlike conventional harmonicas, blowing and drawing produce the same notes because its tuning is closer to the note layout of a typical Asian tremolo harmonica or the Polyphonias. Pitch pipe[edit] The pitch pipe is a simple specialty harmonica that provides a reference pitch to singers and other instruments. Chromatic pitch pipes, which are used by singers and choirs, give a full chromatic note octave. Pitch pipes are also sold for string players, such as violinists and guitarists; these pitch pipes usually provide the notes corresponding to the open strings. This technique can be accomplished in a number of ways. The most common way is to change how the harmonica is held. For example, the vibrato effect can be achieved by opening and closing the hands around the harmonica very rapidly. The vibrato might also be achieved via rapid glottal vocal fold opening and closing, especially on draws inhalation simultaneous to bending, or without bending. This obviates the need for cupping and waving the hands around the instrument during play. This gives a quick pitch-alternating technique that is slightly more than vibrato and achieves the same aural effect on sustained notes, albeit by using two different tones

instead of varying the amplitude of one. In addition to the 19 notes readily available on the diatonic harmonica, players can play other notes by adjusting their embouchure and forcing the reed to resonate at a different pitch. This technique is called bending, a term possibly borrowed from guitarists, who literally bend a string to subtly change the pitch. Bending also creates the glissandos characteristic of much blues harp and country harmonica playing. Bends are essential for most blues and rock harmonica due to the soulful sounds the instrument can bring out. The "wail" of the blues harp typically requires bending. In the s, Howard Levy developed the over bending technique also known as "overblowing" and "overdrawing". Over Bending, combined with bending, allowed players to play the entire chromatic scale. In addition to playing the diatonic harmonica in its original key, it is also possible to play it in other keys by playing in other "positions" using different keynotes. Using just the basic notes on the instrument would mean playing in a specific mode for each position. For example the Mixolydian mode root note is the second draw or third blow , produces a major dominant seventh key that is frequently used by blues players because it contains the harmonically rich dominant seventh note, while the Dorian mode root note is four draw produces a minor dominant seventh key. Another technique, seldom used to its full potential, is altering the size of the mouth cavity to emphasize certain natural overtones. When this technique is employed while playing chords, care must be taken in overtone selection as the overtones stemming from the non-root pitch can cause extreme dissonance. Harmonica players who amplify their instrument with microphones and tube amplifiers , such as blues harp players, also have a range of techniques that exploit properties of the microphone and the amplifier, such as changing the way the hands are cupped around the instrument and the microphone or rhythmically breathing or chanting into the microphone while playing. Blues and folk players refer to the instrument with a range of less common names, including hand reed, Mississippi saxophone, licking stick, pocket sax, toe pickle, tin sandwich, ten-holed tin-can tongue twister, blues burger, harpoon, moothie, and French harp. History[edit] The harmonica was developed in Europe in the early part of the 19th century. Free-reed instruments like the Chinese sheng were fairly common in Asia since ancient times. Christian Friedrich Ludwig Buschmann is often cited as the inventor of the harmonica in , but other inventors developed similar instruments at the same time. These instruments were made for playing classical music. Early instruments[edit] The harmonica first appeared in Vienna, where harmonicas with chambers were sold before see also Anton Reinlein and Anton Haeckl. Richter tuning, invented by Joseph Richter who also is credited with inventing the blow and draw mechanism , was created in and was eventually adopted nearly universally. In Germany, violin manufacturer Mr. Meisel from Klingenthal bought a harmonica with chambers Kanzellen at the Exhibition in Braunschweig in He and the ironworker Langhammer copied the instruments in the Graslitz three miles away; by they had produced hundreds of harmonicas. Many others followed in Germany and also nearby in what would later become Czechoslovakia. In , Johann Wilhelm Rudolph Glier also began making harmonicas. In , Christian Messner, a cloth maker and weaver from Trossingen , copied a harmonica his neighbour had brought from Vienna. He had such success that eventually his brother and some relatives also started to make harmonicas. From onwards, his nephew Christian Weiss was also involved in the business. By , there were at least three harmonica-making businesses: Seydel is still in business. Owing to competition between the harmonica factories in Trossingen and Klingenthal, machines were invented to punch the covers for the reeds. In , Matthias Hohner, a clockmaker from Trossingen, started producing harmonicas. Eventually he became the first to mass-produce them. He used a mass-produced wooden comb that he had made by machine-cutting firms. By , he began supplying the United States. By the s, the diatonic harmonica had largely reached its modern form. Other types followed soon thereafter, including the various tremolo and octave harmonicas. By the late 19th century, harmonica production was a big business, having evolved into mass production. New designs were still developed in the 20th century, including the chromatic harmonica , first made by Hohner in , the bass harmonica, and the chord harmonica. In the 21st century, radical new designs have been developed and are still being introduced into the market, such as the Suzuki Overdrive, Hohner XB, and the ill-fated Harrison B-Radical. Diatonic harmonicas were designed primarily for playing German and other European folk music and have succeeded well in those styles. Over time, the basic design and tuning proved adaptable to other types of music such as the blues , country , old-time and more. The harmonica was a success almost

from the very start of production, and while the center of the harmonica business has shifted from Germany, the output of the various harmonica manufacturers is still very high. The United States had two significant harmonica manufacturers, and both were based in Union, New Jersey. One was Magnus Harmonica Corporation, whose founder Finn Magnus is credited with the development of plastic harmonica reeds. The other was Wm. Both companies ceased harmonica production. The only recent American contender in the harmonica market was Harrison Harmonicas, which folded in July. It was announced soon thereafter that the rights to the Harrison design had been sold to another company to finish production of orders already placed. Recently, responding to increasingly demanding performance techniques, the market for high-quality instruments has grown. Europe and North America[edit] Some time before Hohner began manufacturing harmonicas in , he shipped some to relatives who had emigrated to the United States. President Abraham Lincoln carried a harmonica in his pocket, [5] and harmonicas provided solace to soldiers on both the Union and Confederate sides of the American Civil War. Frontiersmen Wyatt Earp and Billy the Kid played the instrument, and it became a fixture of the American musical landscape. Harmonicas were heard on a handful of recordings in the early s, generally labeled as a "mouth organ". The first jazz or traditional music recordings of harmonicas were made in the U. Recordings known at the time as "race records", intended for the black market of the southern states, included solo recordings by DeFord Bailey and duo recordings with a guitarist Hammie Nixon, Walter Horton, or Sonny Terry. Hillbilly styles were also recorded, intended for white audiences, by Frank Hutchison, Gwen Foster and several other musicians. There are also recordings featuring the harmonica in jug bands, of which the Memphis Jug Band is the most famous. But the harmonica still represented a toy instrument in those years and was associated with the poor. It is also during those years that musicians started experimenting with new techniques such as tongue-blocking, hand effects and the most important innovation of all, the second position, or cross-harp.

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William Zeitler plays his arrangement of Tchaikovsky's "Dance of the Sugar Plum Fairy" from the Nutcracker () on the glass armonica invented by Benjamin Franklin. (This is the song Hanna plays.

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