Aztec Organography

More is known of the way that Aztecs played their teponaztlis, huehuetls, tlapitzallis, áyotls, and omichicahuaztlis than of what successions of pitches constituted their melodies. Two types of evidence survive: (1) descriptions of the way they played their instruments by Spanish chroniclers such as Bernardino de Sahagún (1500?–1590), Diego Durán (1537–1588), and Antonio de Cibdad Real (1551–1617); and (2) pictorial evidence of the players' postures from such codices as the Azcatitlan (painted *ca.* 1550 in the northern part of the valley of Mexico), Florentino (music instruments pictured at plates 8.38, 11.17, 11.19, 16.57, 17.63, 23.16, 23.19, 32.91, 48.64, 48.68–70, 51.88, and 55.31),[1] and Tudela (dated 1553).

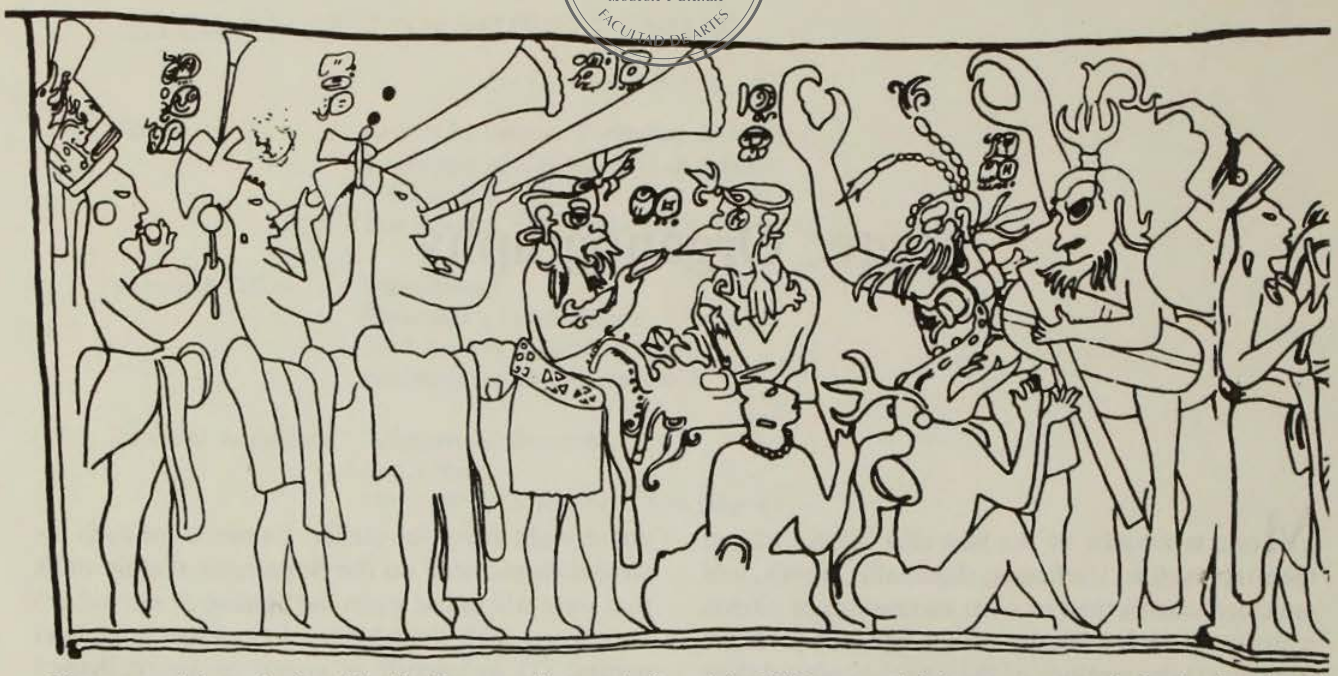
The sixteenth-century pictorial evidence, abetted by the chroniclers' descriptions, can be juxtaposed with the Mayan wall paintings found in 1946 at an eighth-century temple in the jungles of Chiapas—a site now called Bonampak. These paintings prove that the Aztecs at the time of Cortés's arrival continued using essentially the same instruments in vogue eight centuries earlier. Examples of such instruments pictured on the Bonampak temple walls that were still in use when the Spaniards arrived are here listed with their Náhuatl (= Aztec language) names: (1) *ayacachtli* (a gourd or gourd-shaped rattle, containing seeds or pebbles, with attached handle); (2) *áyotl* (the shell of a turtle, struck with a stag's antler, each arm of the plastron sounding a different pitch); (3) *huehuetl* (upright drum, fashioned out of a hollowed tree trunk, stretched across the top with a jaguar skin that could be tightened or loosened to raise or lower the pitch, the player using his fingers rather than mallets).

What names did the Maya give Aztec instruments? The *huehuetl* was the Mayan *pax*. The *teponaztli* (two-pronged wooden slit drum played with mallets, the player standing before the instrument placed on a trestle, or being seated) was the Mayan *tunkul*. The *áyotl* was the Mayan *kayab*.

Widely used throughout Mesoamerica, the Aztec *teponaztli* was the Tarascan *cuiringua*, the Otomí *nobiuy*, and the Zapotec *nicàche*. Because the like of an Aztec *teponaztli* had never been seen by European eyes, Maturino Gilberti in his *Vocabulario en lengua de Mechuacan* (México: Juan Pablos, 1559) had to resort to *tañer* (= play) *teponaztli* to translate the Tarascan verb *cuirinani*. Juan de Córdova's *Vocabvlario en lengua çapoteca* (México: Pedro Ocharte and Antonio Ricardo, 1578) vouches that the Zapotec *nicàche* was the same as the Aztec *teponaztli*.

For the reader's greater convenience, wind and percussion instruments are listed alphabetically below by their Náhuatl names. After each is synopsized various data from chroniclers and codices concerning how they were played. Much more data of both kinds than can be summarized below appears in

[1] The native artists' paintings in the *Florentine Codex* (Biblioteca Medicea Laurentiana, Codices 218–220) were reproduced in Bernardino de Sahagún, *Historia de las cosas de Nueva España*, ed. Francisco del Paso y Troncoso (Madrid: Hauser y Menet, 1905–1907), volume 5. Arthur J. O. Anderson and Charles E. Dibble, translators of the *Florentine Codex: General History of the Things of New Spain*, Parts 1–13 (introductory volume and books 1–12) (Santa Fe, New Mexico: School of American Research and University of Utah Press, 1950–1982), used Paso y Troncoso's volume 5 as source for their *Florentine Codex* illustrations. For those showing musical instruments, see *Book I—The Gods* [1950 and 1970 (2d ed.], illustrations 28 and 38; *Book II—The Ceremonies* [1951], illustrations 17, 19, 57, 63, 68; *Book VIII—Kings and Lords* [1951], illustrations 68, 69, 70, 88; *Book IX—The Merchants* [1959], illustration 31.



Mayan musicians depicted in the Bonampak murals found in 1946 at an eighth-century temple in the jungles of Chiapas. From left to right: rattler, two players of wooden flaring trumpets, five dancers wearing animal disguises, teponaztli (*tunkul*) player, three beaters of the áyotl (*kayab*), huehuetl (*pax*) player, four shakers of large rattles. Diagram of the murals drawn by Agustín Villagra C.

Atecocoli (conch shell) players, during a heart-extraction. Source: Florentine Codex (Peñafiel, item 28).

Robert Stevenson's *Music in Aztec & Inca Territory* (Berkeley/Los Angeles/London: University of California Press, 1976), pages 31–85.

atecocoli = *atecuculli*, conch trumpet (*puuaqua* in Tarascan, *paatáotocuecheni* or *paanicataopáni* in Zapotec)

Four holes are cut into the shell of a Tepic museum examplar (illustrated in Samuel Martí, *Instrumentos musicales precortesianos* [Mexico: Instituto Nacional de Antropología, 1955], p. 52). These holes can be stopped with fingers, like the holes of a flute—thus providing several pitches outside any one overtone series. A conch trumpet at the Museo Nacional de Antropología in Mexico City is fitted with a clay mouthpiece, thus facilitating overblowing.

According to Sahagún (*Florentine Codex, Book II—The Ceremonies* [Santa Fe: School of American Research, 1950], p. 98), conch trumpets were blown by Aztec priests as they marched in procession. In Hernando Alvarado Tezozomoc's *Crónica Mexicana* (1598) (México: Editorial Leyenda, 1944), p. 331, priests are described as having played during the 1487 dedication of the Great Temple at Mexico City "a large white shell trumpet, the sound of which was enough to curdle the blood of those who heard it."

The time of day and night when conch trumpets were blown mattered greatly. Near midnight, the priests in Aztec temples were aroused for prayer and penance by the conch trumpeter (if necessary, a neophyte poured water on the trumpeter to awaken him).

ayacachtli

The Toltecs, whose last ruler, Huémac, was forced to flee their capital of Tula in 1168, raised cultural standards to unprecedented levels—according to the Aztec informants who instructed Sahagún. The Toltecs "were fine singers and while dancing or singing played drums and shook rattle sticks called *ayacachtli*," reported Sahagún (*Historia General de las Cosas de Nueva España*, ed. Ángel M. Garibay K. [México: Editorial Porrúa, 1956], Vol. III, p. 188).

Eduard Seler (*Gesammelte Abhandlungen*, II [Berlin: A. Asher & Co., 1904], 677) claims that the head of the rattle as pictured in Sahagún, *Florentine Codex, Book VIII*, plate 70, looks "flower-shaped." As translated from the Náhuatl by Arthur J. O. Anderson and Charles E. Dibble, Sahagún's text accompanying plate 70 does indeed specify "rattles shaped like dried poppy heads" (*Florentine Codex, Book VIII—Kings and Lords* [1954], p. 45). Alonso Molina, in his *Vocabvlario en lengva mexicana y castellana* (México: Antonio de Spinosa, 1571), folio 3, defines ayacachtli as "sonajas hechas a manera de dormideras" ("rattles looking like poppies"). Held aloft and shaken to the rhythm of dancing feet, pairs of golden ayacachtli were shaken at precortesian

Instruments in Moctezuma II's treasury (*mixcoacalli*) included "rattles shaped like dried poppy heads," huehuetl and teponaztli (player's mallets called *olmaitl* shown between seated musicians), atecocoli (conch shell), and tlapitzalli (flutes), but not áyotl or omichicahuaztli.

royal ceremonies (*Book VIII—Kings and Lords* [1954], p. 28: *aiacachtli coztic teucujtlatl*).

So essential were ayacachtlis to music-making in any Aztec context, that *antleh toacach* (we have no rattle)—an expression found at the close of Canto H in Song LXI of *Cantares mexicanos*—means that without rattles the children who were learning the song could take no pleasure in it.[2] The occasion for which they were learning it was the feast of St. Francis held Saturday, October 4, 1567. The five Indians who danced during the song wore plumes of heron feathers.[3]

Nor did the insistence on featherwork plumes and the shaking of ayacachtlis during every Aztec song die out in the next century. Andrés Pérez de Ribas in his *Historia de los triunfos de nuestra Santa Fe . . . Tomo III* (México: Luis Álvarez y Álvarez de la Cadena, 1944 [Madrid: Alonso de Paredes, 1645]), capítulo XI (page 326), described the rôle of instruments in the Aztec *tocontín*.

> On the dancer's left arm is an expensive bracelet supporting one wand of extremely beautiful green featherwork and another wand that is shaken to the beat of the dance. In his right arm the dancer carries an instrument called *ayacaztli*. These are their small rattles, made of gilded gourds with pebbles inside that they shake to the beat of the music, adding gracefulness to the dance.

Pérez de Ribas adds that singing (accompanied by instruments)—not merely instrumental music—was the invariable rule for all Mexican dances.[4]

To add local color to a Mexican dance in his three-act operatic masterpiece, *Fernand Cortez, ou La Conquête du Mexique* (Paris: Académie Impériale de Musique, November 28, 1809), Gaspare Spontini (1774–1851) added ayacachtli to the accompanying ensemble. Although numerous other operas introducing Cortés and Moctezuma had reached the boards in the preceding half century (Gian Francesco de Majo, 1765; Josef Mysliveček, 1771; Baldassare Galuppi, 1772; Giacomo Insanguine, 1780; Marcos António Portugal, 1798), Spontini pioneered in calling for an "autochthonous" instrument. Scarcely less meticulous in his scoring than Meyerbeer, Spontini specified at page 271 of the full score published in 1817 by Erard: "Ce pas est accompagné avec l'instrument appellé Ajacatzily, que le danseur frappera ad libitum."

áyotl

Known among the Mayas as *kayab* (the tortoise symbol became the hieroglyph of the seventeenth *uinal*, or period of 20 days), the *áyotl* was a tortoise shell struck on the belly side with stag's antlers. The ethos of the instrument becomes clear in Hernando Alvarado Tezozomoc's description (written *ca.* 1598) of the 1487 dedication of the Great Temple at Tenochtitlán (*Crónica Mexicana*, p. 331) and in Sahagún's references (*Florentine Codex, Book II—The Ceremonies*, chapters 25, 35).[5] Because of its frequent use at sacrificial and memorial events, it seems not to have been considered appropriate for light pastimes. Nor is it included in the inventory of Moctezuma's palace instruments. Sahagún (*Book VIII—Kings and Lords*, Chapter 14, par. 7) excludes it from the *mixcoacalli*, "the gathering place of professional singers and dancers, and the [royal] storeroom for all their musical instruments and dance costumes."[6]

At Tarascan royal exequies, the dead ruler's chief drummer marched in the funeral procession with some forty other household officials. "Some alligator bones and tortoise shells" provided fitting music (*Relación de las ceremonias y ritos y población y gobierno de los indios de la provincia de Michoacán* [1541], Ms ç. IV. 5 at El Escorial, fol. 31, lines 11–12: "yvan tañendo delante vno vnos huesos de caymanes otros vnas tortugas"). At the close of the ceremony, the royal wives and officials were clubbed to death by executioners and all dumped into a common grave.[7]

[2] *Cantares mexicanos: Songs of the Aztecs*, translated by John Bierhorst (Stanford: Stanford University Press, 1985), pp. 297 and 468.

[3] *Ibid.*, pp. 466–467. Fray Pedro de Gante (1480?–1572) presumably taught the song.

[4] Pérez de Ribas, III, 326: "Al rededor del tambor era el lugar de los ancianos y principales mexicanos, que eran los que entonaban el canto, que siempre acompañó al baile mexicano." In this context "mexicanos" means Aztecs and "baile mexicano" signifies Aztec dance.

[5] Anderson and Dibble. *Florentine Codex, Book III* (1951), pp. 77 (line 19), 140 (line 18).

[6] *Florentine Codex, Book IX*, p. 45. The named instruments were: *teponaztli, huehuetl, ayacachtli, tetzilacatl, çoçoloctli.*

[7] For the manuscript facsimile, see *Relación de las ceremonias y ritos . . . de Michoacán (1541), Reproducción facsímil del Ms. ç. IV. 5. de El Escorial*, José Tudela transcription, preliminary study by José Corona Núñez (Morelia, Michoacán: Balsal Editores, S.A., 1977), p. 221. Francisco Miranda attributed the authorship of the 1541 *Relación* to the Franciscan Jerónimo de Alcalá. In his edition, *La Relación de Michoacán* (Morelia: Fimax Publicistas Editores, 1980), the quoted passage (Miranda, p. 276) is preceded opposite page 272 with the reproduction of the painting of the Cazonci's exequies in the El Escorial source (lámina 39). Before his corpse go four musicians—two blowing

Panels in the 1541 account of Tarascan rites show upper left the ruler's corpse, lower left corpse being carried aloft to the sound of two conch trumpeters and two players of flaring wooden trumpets, lower right the wives ready to be clubbed to death.

chicahuaztli

In contrast with the ayacachtli, which was a rattle with short handle that was equally at home in cult and pastime ensembles, the *chicahuaztli* was a long rattle board (ending in a jagged point) which could be shaken solely in religious ceremonies. In chapter 27 of Sahagún's *Book II—The Ceremonies* (Anderson and Dibble, 1951, p. 99),[8] he describes the chicahuaztli dangled in front of a captive who impersonates Xilónen (Young Corn Mother): "And when they had come to a place where Xilónen was to die, then the fire priest advanced to receive her; before her he carried the rattle board [*chicaoaztli* = *chicahuaztli*], rattling it." At the feast of the water gods described in Chapter 25 of the same book (Anderson and Dibble, 1951, p. 77 = *Historia General*, 1969 ed., I, 164, 167), a priest marches along with an oversize chicahuaztli on his back. Its large size permits the stringing of several rattles on the *ayacachicauaztli* ("mist rattle board"). These need only shaking to produce rain.

chililitli or *caililiztli*

Sahagún's informants mentioned *chililitli* (copper disks) as being struck with pine [hammers] during the feast of the water gods (*Book II*, Chap. 25 [Anderson and Dibble, 1951, p. 77, line 2]). At midnight the priests disrobed, bloodied themselves with the pricking of maguey spines, then bathed themselves, blew *tecciztli* (conch trumpets) and struck *chililitli*.

Chililitli joined the ensemble of blown conch shells, flutes, and a metal gong struck with a metal hammer during the four daily calls to prayer that were sounded form the ninth story of a temple erected at Tezcotzinco by Nezahualcóyotl (1402–1472), poet-king of Tezcoco. The ninth story

conches, two blowing long vertical wooden trumpets held high in the air.

[8]Spanish text in Ángel María Garibay K., ed., *Historia General de las Cosas de Nueva España*, 2. ed. (México: Editorial Porrúa, 1969), I, 181.52: "la tabla de las sonajas, que se llamaba chicauaztli."

contained a shrine to the unseen "Lord of Creation" = Teotloquenahuaque Tlachihualcipal Nemoani Illhuicahua Tlalticpaque. After Nezahualcóyotl's death, the whole temple came to be called *Chililitli* in honor of the chililitli's tintinnabulation.[9]

huehuetl

A "venerable man" is a *huehue* in Náhuatl (= *veue* in Molina, fols. 117^{v}, 157); and the most venerated of Mexican instruments was the *hueheutl*. So fundamental was it to Aztec musical culture that Daniel Castañeda and Vicente T. Mendoza could publish a 127-page essay adorned with 50 plates and numerous diagrams on the huehuetl family alone (*Anales del Museo*, 4ª época, VIII [1933], 287–310, 449–549, 661–662).

Commonly, the huehuetl was a cylindrical wooden drum [the frame could also be of clay] sitting on three legs, the top of the drum stretched with animal hide, the bottom open. Beat on with the fingers and not mallets, it stood upright and could usually emit two well-defined tones—the higher by striking near the rim of the drumskin, the lower by moving toward the center. With the skin evenly stretched and of the same consistency throughout, these two tones sounded a fifth apart. Not only do early Spanish writers confirm this interval of a fifth, but also modern investigators working with experimentally constructed huehuetls (*Anales del Museo*, 4ª época, VIII, 280–281, 290). Castañeda and Mendoza did, however, find one huehuetl, "probably pre-Cortesian," which emitted the interval of a fourth when struck near the rim and near the center of the drumhead (*ibid.*, pp. 661–662).

For the Aztec poet, the huehuetl captured every mood; but best of all it incited to sacrificial heroism. Take for example the twelfth item in *Cantares mexicanos* (a song edited in Leonhard Schultze Jena's *Alt-Aztekische Gesänge* [Stuttgart: W. Kohlhammer Verlag, 1957], pp. 26–27).[10] The poem starts:

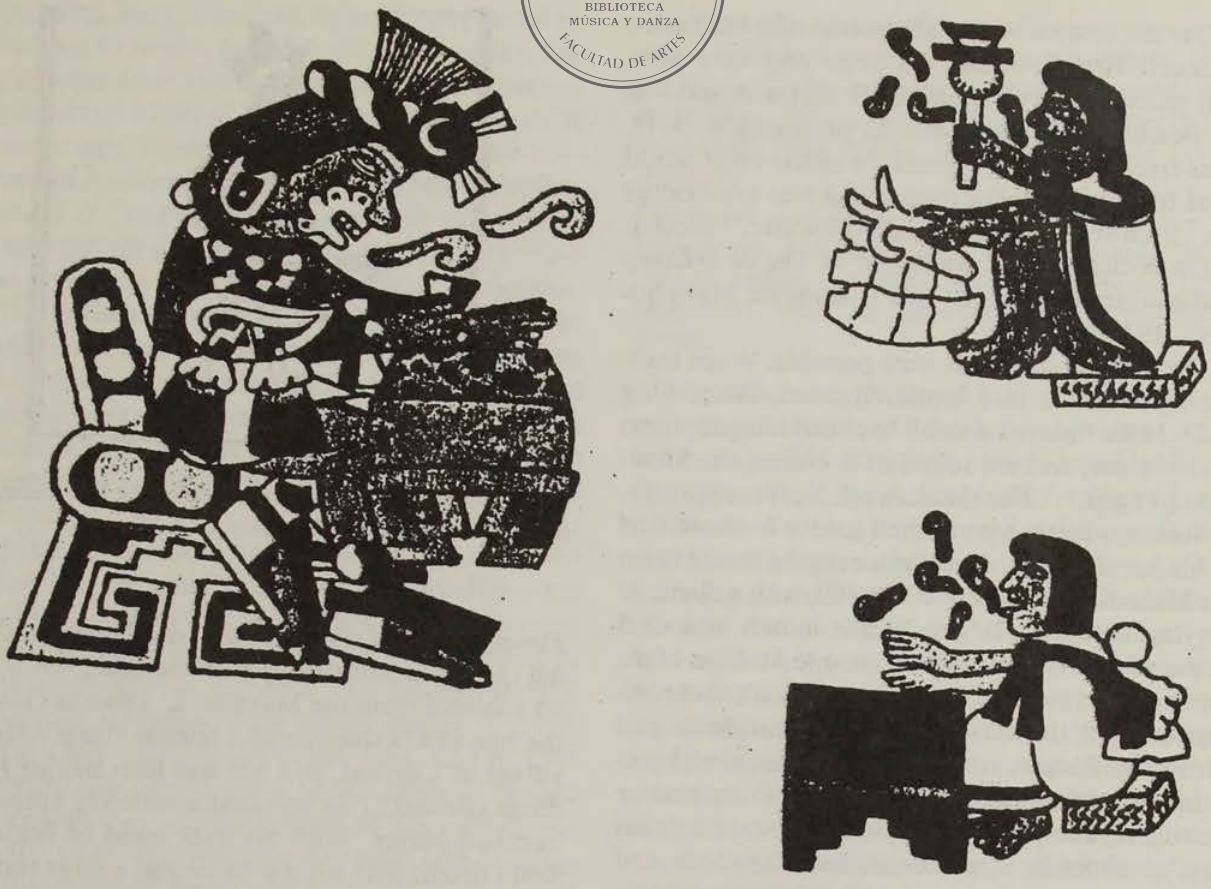
I am playing my huehuetl, I who hunt for songs to awaken and fire our friends whose hearts lie listless, for whom the day does not yet break—those who sleep in comas, those who glory in gloomy night when the flower-

Tlalpanhuehuetl, Museo Regional de Toluca, 97 cm high, 42 cm diameter. This is the so-called Malinalco drum, Matlazinca culture.

[9] Concerning the various names for the "Lord of Creation," see Fernando de Alva Ixtlilxóchitl, *Obras históricas*, ed. Edmundo O'Gorman (México: Universidad Nacional Autónoma de México, 1975), II (*Historia de la Nación Chichimeca*), 7. Claiming lineal descent from Nezahualcóyotl, Ixtlilxóchitl wished to transform his ancestor into a protomonotheist whose Chililitli temple was dedicated to "el dios universal de todas las cosas, creador de ellas y a cuya voluntad viven todas las criaturas, señor del cielo y de la tierra."

For the nine-story tower, see O'Gorman edition, II, 127 (chap. 45). But by the time of Ixtlilxóchitl (1578–1650) the Chililitli tower was in ruins (I, 405: "[Nezahualcóyotl] mandó hacer una torre en Texcuco de nueve sobrados que hoy día se ve en las ruinas, que se llamaba Chililitli").

[10] In evaluating Schultze Jena's translations (up through folio 57), John Bierhorst wrote thus (*Cantares mexicanos* [Stanford University Press, 1985]), p. 120: "The translation, useful in spots, is on the whole unacceptable and has been widely ignored." On the other hand, Bierhorst's own translations have received less than favorable reviews. See *American Anthropologist*, LXXXVIII, 1015 (December 1986); *Hispanic American Historical Review*, LXVI, 786 (November 1986), for serious objections.



Two seated players of small huehuetls. Upper right, shaker of the ayacachtli (right hand) who with his left hand beats the áyotl. The glyphs coming out of each player's mouth denote singing. (Codex Vaticanus B3773, 38; Mixtec culture).

ing dawn already sings her song and when once again morn lightens the place where huehuetls play.[11]

With equal appropriateness huehuetls hymn the triumphs when Mexico wins, or console the widows when Mexico loses the battle, as for instance when Tzitzicpandáquare leads the Tarascans to the slaughter of 16,000 Aztec warriors.[12]

Cylindrical drums, the upper open end covered with cured skin, came in several sizes. Those called *tlalpanhuehuetl* rested on the ground and were usually so tall that a man had to stand while playing one. Only Hernando Alvarado Tezozomoc vouches for a tlalpanhuehuetl short enough so that the drummer could sit while playing it (*Crónica Mexicana* [1598], México: Editorial Porrúa, 1975, p. 427 [chapter 53]: "los varones convidados cantaban sentados con un tambor bajo *tlalpanhuehuetl*, el canto de difunto"). The huehuetls now in museums were made of a hollowed-out tree trunk or of a cylinder of clay. Nevertheless, huehuetls of precious metal may also have been known before cupidity turned them into coin. At least three among the 91 *Cantares mexicanos* specify golden huehuetls = *teocuitiahuehuetl* (Schultze Jena ed., p. 124, line 22; p. 182, line 15; p. 300, line 7).

Oak, walnut, and a Mexican conifer called *ahuehuete*, especially the latter, were the favored trees for making huehuetls. The National Museum tlalpanhuehuetl known as the Tenango drum is of oak. But

[11] Bierhorst ends his translation of this passage thus: "Let them come and hear the flower drum songs drizzling down incessantly beside the drum."

[12] Nicolas León, *Los Tarascos. Notas históricas, étnicas y antropológicas* (México: Editorial Innovación, 1979), p. 107; Diego Durán, *Historia de las Indias de Nueva-España* (México: J. M. Andrade y F. Escalante, 1867), I, 295: "tomauan el atambor los cantores y empeçauan á cantar cantares de luto y de la suciedad quel luto y lágrimas traen consigo." Also, Durán's *Atlas* (México: Ignacio Escalante, 1880), tratado 1, lámina 12, capítulo 38. English version of Durán's chapters 37 and 38 in *The Aztecs*, translated by Doris Heyden and Fernando Horcasitas (New York: Orion Press, 1964), pp. 165–173.

by far the best known of all drums—the Malinalco huehuetl first described by Seler and now photographed in every popular book on the Aztecs—is of ahuehuete (*Anales*, lám. 12 preceding p. 311). This tree resembling cypress "was the chief wood used for musical instruments; and was even called the 'drum-tree' growing beside the water," according to William Gates, translator of *The de la Cruz-Badiano Aztec Herbal of 1552* (Baltimore: Maya Society, 1939, p. xxvii).

The smallest huehuetls were portable. When leading his warriors into battle, Itzcóatl, Aztec king 1427–1440, "played a small huehuetl hanging from his shoulder, and the sound of it excited the Mexicans to fight."[13] Nezahualcóyotl, his Texcoco ally, rushed into battle with a small golden huehuetl tied to his left shoulder. Huehuetls ranging in size from the Malinalco exemplar—97 cm tall, with a diameter varying between 41.5 cm at the mouth and 48.5 at the middle bulge—to a stone one 41.8 cm high, are explained (with diagrams, dimensions, and photographs) in the classic study by Castañeda and Mendoza. Players tuned their huehuetls with exquisite precision, either tightening the drumhead or heating it. The pitches of so variably sized a drum family cannot be dogmatized; but Castañeda and Mendoza suggest that modern kettledrums inhabit ranges an octave or more lower than that of museum huehuetls.[14]

Codex Laud, 34 (Bodleian Library), shows the young moon goddess Xochiquetzal. Her right hand holds what looks like a two-pronged antler. This is her beater for a shallow huehuetl. With her left hand she swings a rattle. On two counts the Codex Laud music-making violates norms: (1) huehuetl players in the other precontact codices are men; (2) they beat it with their hands—not with an antler or a mallet. Sometimes they prove themselves ambidextrous, with one hand on the drum, in the other a rattle. To cite examples from Mixtec records: both Codex Vaticanus B3773, 38, and Nuttall, 73,[15] picture the

Small huehuetl hanging from Itzcóatl's left shoulder; rattle in right hand (Florentine Codex).

player pounding the drum with one hand and shaking the ayacachtli = rattle with the other. Or to cite an example from the Maya area: Thomas Gann in the late 1890's discovered a temple mural near the village of Corozal, in what was then British Honduras (Belize). This revealed a superbly costumed huehuetl player. With his right hand he beats the death drum; with his left he swings a large rattle.[16] In such earlier murals from the Maya area as the Bonampak paintings, and in such Mixtec codices as Borgia (plate 60) the player uses both hands, however. Two hands are also the rule in the paintings accompanying Sahagún's Florentine Codex.

The most precise written instructions and notation that a trained ethnomusicologist can give today, telling how drums from the Guinea Coast of Africa should be played, do not help us very much unless we can ourselves hear them played, either live or in

[13] Durán *Historia*, I, 76: "el rey *Itzcóatl* tocó un pequeño atambor que á las espaldas traya, al son del qual alçaron los mexicanos todos los del exército tan gran vocería y silbos y otras algaçaras que pusieron gran temor en toda la gente contraria." [= *The Aztecs* (1964), p. 58].

[14] *Anales del Museo*, 4ª época, VIII, 302. They calculated 479 vps = B♭ above middle C for the fundamental of the Tenango huehuetl in the Museo Nacional (illustrated in plates 48 and 49 accompanying the article).

[15] Seler, *Comentarios al Códice Borgia* (México: Fondo de Cultura Económica, 1963), I, 42, shows 4-Monkey playing the drum with his right hand, shaking the rattle in his left. This cut, credited to Nuttall 73, reverses the hands used for playing in Codex Vaticanus B3773, 38 = Seler, *Gesammelte Abhandlungen zur Amerikanischen Sprach- und Altertumskunde* (Berlin: A. Ascher, 1904), II, 699 (Abb. 5).

[16] Thomas Gann, "Mounds in Northern Honduras," *Nineteenth Annual Report of the Bureau of American Ethnology, 1897–98*, pt. 2 (Washington: Government Printing Office, 1900), plate xxxi after p. 670. The nine-foot section of the west wall from which this plate was copied no longer exists. See J. Eric S. Thompson, *Maya Archaeologist* (Norman: University of Oklahoma Press, 1963), p. 226, for the history of its destruction.

a recording. How, then, can we expect any useful information to survive from the sixteenth century, telling us what drum rhythms and pitches were the rule in precontact Mexico? Nevertheless, the series of 91 Aztec songs already several times alluded to—*Cantares mexicanos* (rated by Ángel María Garíbay Kintana as "one of the most valuable and authentic sources" of pre-Hispanic life and thought"[17])—does give some detailed drum playing instructions.

The drummer to whom we are indebted for the advice on how to beat the huehuetl that heads Song XIV of this collection came from Azcapotzalco, the Tepanec capital subdued by the closely neighboring Aztecs in 1427. As a youth this drummer studied in Tlatelolco. Each of his three dated songs in *Cantares mexicanos*, XIV, LV, LVIII, at folios 7 (1551), 37^{v} (1553), and 41 (1565), begins with notation for the drums. His name in the manuscript—Don Francisco Plácido[18]—makes him seem a Spaniard. However, all the leading Indians of the century who learned to write in the Roman alphabet took Spanish names, sometimes dropping their native names entirely. Plácido had noble blood in his veins, and in 1565 governed the Otomí town of Xiquipilco. Legend descending through the mouths of Boturini (1746) and Beristaín (1819) makes him a composer of songs for the devotion denounced by Sahagún as a mere continuation of the old superstition of Tonantzin.[19]

Certainly he claimed nothing new for the rhythmic scheme explained at the beginning of Song XIV. Instead he claimed to be reviving the old way of beating drums for a "Huexotzinco" or Huejotzingo song. Paraphrased, his directions run thus:

> The huehuetl is beaten in this way. When a stanza ends, with another to follow, there are three drumbeats. What the pattern is when a stanza begins involves single peals dying away. Next, comes a roll near the center [of the drumhead]. This breaks off, whereupon the pattern resumes.
>
> The singer must come in at his proper place and will know where. This song-dance type was revived at Easter 1551 in the house of Diego de León,[20] governor of Azcapotzalco, with Don Francisco Plácido beating the drums.

As numbered in Leonhard Schultze Jena's posthumously published *Alt-Aztekische Gesänge*, Song XLVIII (pages 296–305) calls for one huehuetl for the first nine strophes, two huehuetls for the next three ("Mit zwei Fellpauken"), three for the next six, four for the next four, and five for the next eight. This is a song of the Tlaxcalans ("Gesang der Tlaxcalteken")[21]—the tribe that engaged periodically in "flowery war" with the Aztecs and had the wit to throw in their lot with Cortés when he came marching through to victory. With any one huehuetl uttering two sounds a fifth apart, ten huehuetls must have given a rich accompaniment indeed to Song XLV (Schultze Jena) = Song LXIII (Bierhorst). There are sixty strophes in this *tombeau* (at folios 50–52^{v}) that memorialize Don Hernando de Guzmán [Omacatzin], the renowned Indian manuscript illuminator who, shortly before his death, became ruler of Coyoacán (father's Náhuatl name was Itzlollinqui).[22]

[17] *Historia de la Literatura Náhuatl* (México: Porrúa, 1953, 1954), I, 52. In 1904 a facsimile of the manuscript (Biblioteca Nacional, México, MS 1628bis [*Cantares mexicanos* occupy fols. 1–85]) was issued under Antonio Peñafiel's supervision (*Cantares en idioma mexicano: Reproducción facsimilaria del manuscrito original existente en la Biblioteca Nacional* [México: Secretaría de Fomento]). Five years earlier he had published a not-altogether-satisfactory transcript (Vol. II in *Colección de Documentos para la Historia Mexicana* [Secretaría de Fomento, 1899]).

[18] For Don Francisco Plácido's biography, see Rafael García Granados, *Diccionario Biográfico de Historia Antigua de Méjico* (México: Instituto de Historia [Publicaciones, primera serie, núm 23, III], 1953), III, 73 [item 4336], 177 [4884]; Garibay, *Historia*, II, 101–102, 104–105, 230, 264; Schultze Jena, pp. 33, 205, 225. See below, note 21.

[19] Joaquín García Icazbalceta, *Bibliografía Mexicana del Siglo XVI*, ed. Agustín Millares Carlo (México: Fondo de Cultura Económica, 1954), p. 381.

[20] According to Charles Gibson, *The Aztecs Under Spanish Rule* (Stanford: Stanford University Press, 1964), p. 168, Diego de León," "gobernador y señor" of the Tepanec part of Azcapotzalco, died in 1555. The heading of Song LIX composed by Don Baltasar Toquezcuauhyo, tla[h]toani of Colhuacan (Aztec city 10 km southwest of Mexico City), says that the composer "gave succor to our poor sought one, Don Diego de León in the year 1536."

[21] In Bierhorst, this is Song LXVI (pages 318–324). He interprets *Yc ontetl huehuetl* to mean "Second drum-*cadence*," *Yc yey huehuetl* to mean "Third drum-*cadence*," *Yc nahui huehuetl* to mean "Fourth drum-*cadence*," and so forth. Apart from the fact that *cadence* is a word without Náhuatl equivalent, the preposition *Yc* means "con" = with (Molina, *Vocabvlario en lengva mexicana y castellana*, 1571, fol. 31^{v}). *Ontetl* means "dos" = two (fol. 77), *yey* means "tres" = three (fol. 35). Nor does Bierhorst in his *A Nahuatl-English Dictionary and Concordance to the Cantares Mexicanos* (Stanford: Stanford University Press, 1985), change cardinal numbers into ordinals. See his equivalencies for *nahui* = four, *macuilli* = five, *chicome* = seven, *chiquei* = eight, *chicunahui* = nine.

[22] For Don Hernando de Guzmán's biography (he once

The first eight strophes require but one huehuetl, the number of huehuetls rising progressively to ten for strophes 49–60.

To intrigue the listener further, the drumbeat pattern can change within any given group of strophes. In the last twelve of the sixty strophes of the song just mentioned (XLV = LXIII), the seventeen-syllable drumbeat pattern for strophes 49–54 (canto J) reads, for instance:

tocoto coti quiti tocoto coti quiti totiti

But strophes 55–60 (canto K) call into play a still more complex pattern involving twenty-two syllables:

toco toco tiquiti toco toco tiquiti totiquiti totiquiti

Complex rhythmic patterns like these betray Spanish influence, contends the eminent Americanist Karl A. Nowotny in his article on Aztec drumming, "Die Notation des *Tono* in den Aztekischen Cantares" (*Baessler-Archiv*, Neue Folge, IV/2 [XXIX. Band] [December, 1956], 186). As part of his analysis, Nowotny tabulates each of the 758 drumbeat patterns recorded in the manuscript of *Cantares mexicanos*. He contends that the earliest datable songs in the collection do always match the simplest drumbeat patterns. Nowotny also discovers another important fact: exactly the same drumming notation served for both the vertical and the horizontal types of Aztec drum—huehuetl (a membranophone) and teponaztli (an idiophone).

Obviously, the *k* sound at the beginning of the drum syllable—whether *co* or *qui*—signaled a deed that the drummer might be allowed only once to a drumbeat group.

What was that "deed"? Nowotny suggests that the *k* signaled something akin to "downbeat." Conductors of European music are nowadays expected to give but one downbeat in a bar. Can the analogy help us comprehend Aztec drumming? Whether the instrument was teponaztli or huehuetl, the Aztec drum syllables coalesce into groups of two to a bar (429 times in the *Cantares*), three to a bar (260 times), four to a bar (47 times), five to a bar (17 times), and six to a bar (2 times). Again: in none of these groups does the *k* drum syllable enter more than once.[23]

No law decreed, however, that a group could not be formed without the *k* drum syllable in it. Reduced to a European analogy, this means that bars could be formed exclusively of upbeats. Nowotny counts 43 instances of *titi*, *toti*, or *toto*, 10 of *tititi*, 6 of *totototo*, 5 of *tototototo*, 3 of *titito*, and 2 each of *titotito*, *totititi*, and *titoti*. He even finds instances of *tititititiiti* and of *totototototo* (one each). In all, 73 groups containing nothing but *t* drum syllables appear, making a tenth of his 758 groups.

What no analyst of the *Cantares mexicanos* drumbeat patterns has thus far denied has to do with relative pitch. All agree that the vowel sounding English "ee" denotes a higher pitch than the vowel sounding English "oh." How wide was the difference? A fifth (or occasionally a fourth) for the huehuetl. Anything from a second to a fourth (or occasional fifth) for the ubiquitous teponaztli.

Granted that all the *Cantares mexicanos* were accompanied by huehuetl and/or teponaztli, what melodic intervals occurred in the singing? Fray Toribio de Motolinía (*ca.* 1490–1565)—who arrived in Mexico in May 1524—wrote in his *Historia de los Indios de la Nueva España* (a work completed in 1541), part 3, chapter 12, that to the Spaniards the singing of native Mexicans seemed "out of tune" (*desentonados*). Their voices also seemed "weak" (*flacas*). The context in which he made these observations reads thus:

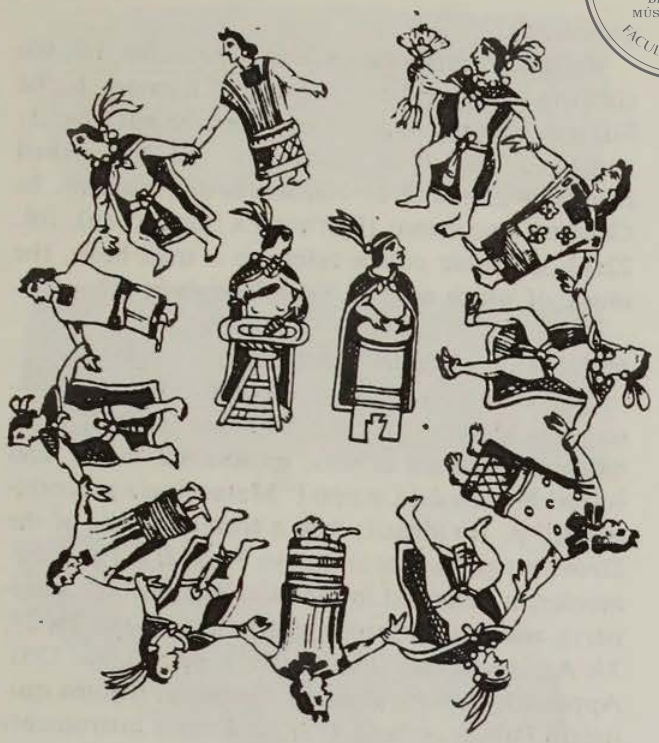
> The third year we started to teach them singing, and some people laughed and made fun of it, both because the Indians seemed to be singing off pitch, and because they seemed to have weak voices. It is true that they do not have voices as strong or as sweet as the Spaniards.[24]

So far as their areitos (festive events involving the playing of huehuetls and teponaztlis, singing, and

governed Tlatelolco), see Garibay, *Historia* [1954], II, 113, and García Granados, *Diccionario*, III, 83 [4406]. According to Chimalpahin Quauhtlehuanitzin, *Anales* (translated from Náhuatl by Rémi Siméon [Paris: Maisonneuve & Ch. Leclerc, 1889]), p. 290, Don Hernando de Guzmán inherited the rule of Coyoacán in 1576 but died that same year during an epidemic. His father, Don Juan de Guzmán Itztlollinqui, was son of Quauhpopocatzin, hereditary king of Coyoacán (Chimalpahin, p. 210).

[23] Bierhorst, *Cantares*, p. 75, makes this same point when he remarks on "the total absence of k-k- within the single phrase." However, at page 74, he equates the k-sound with an upbeat, rather than downbeat.

[24] Toribio de Benavente, *Historia de los indios de la Nueva España*, ed. Claudio Esteva Fabregat (Madrid: *Historia* 16, 1985), p. 260: "El tercero año les impusimos en el canto, y algunos se reían y burlaban de ellos, así porque parecían desentonados como porque parecían tener flacas voces, y en la verdad no las tienen tan recias ni tan suaves como los españoles."



Dancers surrounding teponaztli and huehuetl players (Diego Durán, *Atlas*, Trat° 2°, Lám[a] 11.[a]). Led by a male dancer shaking an ayacachtli, the twelve dancers holding hands in a ring alternated sexes.

Clay ocarina in the shape of priest blowing a three-tube multiple flute, 13 cm high. Martí private collection. Maya culture, *ca.* 500 A.D. Emitting the notes a¹ and b¹, this ocarina came from a gravesite on Jaina island. One of the tubes of a multiple flute such as is shown in the effigy was characteristically longer than the other two. All three notes sounded simultaneously.

dancing) were concerned, Motolonía provides an extensive description in his *Memoriales*, part 2, chapter 26. According to him "singers with good bass voices were the most sought after."[25] In keeping with what he noted concerning "distuned" singers, he also mentions flageolets (*flautillas*) that seemed none too well tuned, when they joined the accompanying ensembles at large public dances.[26] However, he insisted that the huehuetls were tuned anew for each song in a song-sequence. While they were being tuned, the singing stopped but the dancing continued.

huilacapitztli

In Samuel Martí's *Instrumentos musicales precortesianos* (México: Instituto Nacional de Antropología e Historia, 1955), invaluable for its numerous illustrations, he identifies only one of the six ocarinas pictured in the chapter on *huilacapitzli* as Aztec. Front and rear views of a five-note clay specimen shaped like a human head (eyes closed, mouth wide open) appear on pages 72–73 to show what an Aztec ocarina in the Museo Nacional de Antropología looks like. The rest of the ocarinas illustrated in this chapter prove the popularity of the instrument in the Mayan and certain Gulf Coast cultures, but not in the Valley of Mexico.[27]

[25] *Memoriales de Fray Toribio de Motolinía*, ed. Luis García Pimentel (México: En Casa del Editor, 1903), p. 340: "cuando estos son buenos contrabajos teníanles en mucho."

[26] *Ibid.*, p. 342: "a tiempos tañen sus trompetas é unas flautillas no muy entonadas."

[27] In *Cantares mexicanos*, huilacapitzli (defined by Molina in fol. 157ᵛ, as *flauta, o pífaro*) occurs only twice, each time in a combination translated by Bierhorst to mean "jade flutes" (fols. 11:19, 27ᵛ:16, [pp. 164–165, 222–223]).

omichicahuaztli

Seler devoted one of his more ambitious articles to the bone rasp when he published "Altmexikanische Knochenrasseln" (*Globus*, LXXIV/6 [August 6, 1898], 85–93). With it were included twenty reproductions of museum exemplars and codical paintings.

For data on the *omichicahuaztli*, the most quoted early authority is Hernando Alvarado Tezozomoc, grandson of the Aztec ruler when Cortés invaded Mexico, Moctezuma II. Chapter 25 of his *Crónica Mexicana* (*ca.* 1598) describes the funeral rites ordered by Moctezuma I (reigned 1440–1469) after a particularly bloody war with the Chalca. Throughout the four-day mourning exercises, youths scraped dried, striated deer bones.[28] Using a smaller bone piece for scraper, they made "very doleful" music. This, plus the din of "raucous flutes," accompanied an old folks' dance around the dressed mummy bundles set up in the great square fronting Huitzilopochtli's temple. After the four days, all these bundles were burned. Durán describes the same ceremonies in his chapter 18 (*Historia de las Indias*, I [1867 ed.], 155). Evidently the rituals throughout were extremely precise. Singing of responses especially composed for the ceremony and hand clapping to the rhythm of the drumbeats preceded the music of "bones with small teeth cut into them like ladder rungs."

So absolute was the funerary character of the omichicahuaztli that Walter Krickeberg could decree that "it was used exclusively in the funeral rites of kings and of famous warriors." According to him, the gritty sounds, produced by scraping notched bone with a shell or bone plectrum, had their symbolical purpose. The discord of death tolerated no suave or "beautiful" sounds, only disagreeable scraping sounds at varying pitches.[29] If this imposes too much of a European interpretation, at least the codices bear him out in limiting the omichicahuaztli to exequies.

quiquiztli

Molina (*Vocabvlario en lengva mexicana*, fol. 90) cites this instrument as a conch-shell trumpet. In the Spanish-Náhuatl section, however, he has already proffered two other names for the conch-shell trumpet—*atecocoli* (=*atecuculli*) and *tecciztli*. In *Cantares mexicanos* (Bierhorst's Song XXXII), fol. 22:12, *quihquiz copan* refers to a snail-horn, the music of which adds to Saint Mary's joy.[30]

tecciztli (=*teczíztli*=*tezizcatli*)

Otro caracol grande—"another large conch"—serves as Molina's succinct definition (fol. 92). Such modern authorities as Seler, Ignacio Ancona H., and Rafael Martín del Campo ("Malacología precortesiana," p. 16) identify it as a trumpet made of the *Strombus gigas*. According to *Book II—The Ceremonies*, it belonged in the calmécac (priests' seminary), and was the priests' instrument (chaps. 21, 27, 34; Anderson and Dibble [1951], pp. 50, 98, 138). Apparently always needing company, it joins quiquiztli (50), teponaztli (98), and other instruments in the passages just cited. Significantly, it finds no place in the repertory of palace instruments (Bk. VIII, chap. 14, par. 7 [1954, p. 45]). At the war captains' feast in the fifteenth month, young fighters and priests chase each other. If the warriors catch a priest they rub him with powdered maguey leaves until he burns and itches so violently that his flesh creeps. If they succeed in breaking into a calmécac, they rob it of mats, seats, and tecciztli. Sahagún here translated *tecciztli* as "cornetas, caracoles."

Tezozomoc tells of priests playing tecciztli at Ahuitzotl's monster dedication of the great temple in 1487. Twenty thousand captives[31] ascended the sacrificial altar to the blasts of tecciztli. According to him, tecciztli could be of either shell or bone.[32]

teponaztli

Just as the huehuetl was the alpha of Aztec instruments, so the *teponaztli* was the omega. A hollowed-out wooden cylinder laid sideways, the teponaztli

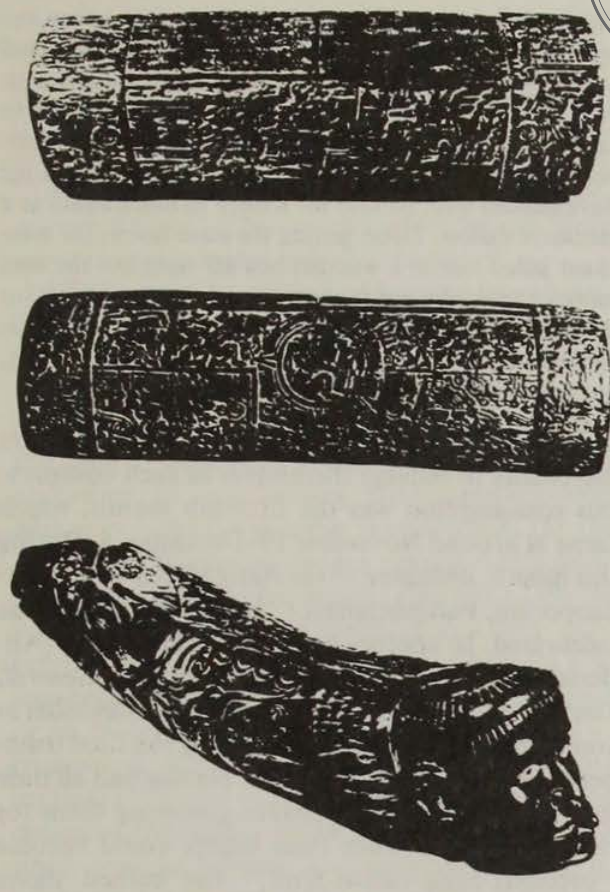
[28] *Crónica Mexicana* (México: Porrúa, 1975 [facsimile of the Orozco y Berra 1878 ed.]), p. 301: "los mozos en todos los actos del canto y baile tocaban el *omichicahuaztli* de venado pero hueco y acerrado, como un caracol, que la hacián resonar muy triste." In Song LXXXIII, fol. 71v:4, omichicahuaztli joins a combination form of chalchihuatl (chalchihua-) meaning jade to make "jade rasps."

[29] *Altmexikanische Kulturen* (Berlin: Safari-Verlag, 1956), p. 245 (translated *Las antiguas culturas mexicanas* [México: Fondo de Cultura Económica, 1961], p. 166).

[30] Bierhorst, *Cantares*, pp. 202–203.

[31] Durán, *Historia*, I, 357 (chap. 44) says that 80,400 were sacrificed. For comment on this number, see *The Aztecs*, trans. Doris Heyden and Fernando Horcasitas, p. 351, note 89.

[32] *Crónica Mexicana*, chap. 70 (p. 515 in Porrúa 1975 reprint): "el *teczíztli* [sic], un caracol grande ó vocina de hueso blanco que atemorizaba las carnes al que la oía." It was played in concert with teponaztli, tlalpanhuehuetl, ayacachtli, áyotl, and chicahuaztli.



Three wooden teponaztlis, the top exemplar in the British Museum, 36.8 cm in length, the other two in the Museo Nacional de Antropología e Historia, Mexico City, 47 cm and 60 cm. The top two teponaztlis are of Mixtec provenience, Oaxaca area, 1300–1500. The bottom teponaztli, made of nogal wood and presented by the Tlaxcala Indians to Cortés, was probably also carved by Mixtecs. The crouching feathered human figure recalls the deity Quetzalcóatl. Its two keys sound a minor third interval.

Aztec teponaztli, Museo Regional de Toluca, 50 cm long. Matlazinca culture. The two tongues sound the fifth a–e^{1} when struck on the platforms adjacent to the center cut. When struck on the outer troughs, the tongues sound an octave.

could produce two pitches that were sounded by striking the two tongues of an I-shaped incision (cut laterally into the wood). Rubber-tipped mallets called *olmaitl* were always used. The interval formed by the two tongues varied from one teponaztli to another, anything from a major second to a perfect fifth being possible.

The wood-carver cut a rectangular opening into the opposite side of the cylinder from the two keys, giving him access to the interior while hollowing out the teponaztli. He needed great skill if he were to hollow out an interior of exactly the right size to reinforce the fundamentals sounded by the two wooden keys.[33] After studying fourteen museum teponaztlis, Castañeda and Mendoza drew up a comprehensive table comparing the natural vibration periods of the resonance chambers with the fundamentals sounded by the two keys. Their results confirm the Aztec wood-carvers' empirical mastery of the laws of acoustics. When an interior vibrates freely at 229 vps = slightly sharp A (third below middle C), as does the hollow inside the so-called Malinalco teponaztli (National Museum), Castañeda and Mendoza found the keys producing sounds of 448 and 672 vps,[34] very close approximations to the first and second overtones.

The carver thinned the tongues by cutting and scraping their inside surfaces or, more rarely, their outside surfaces. When the outside was thus cut, visible troughs resulted. If the cut was sufficiently sharp, the resulting "platform" may even have given a tongue the look of being divided into two separate keys. It of course remains true that the tongues of

[33] "Los Teponaztlis en las Civilizaciones Precortesianas," *Anales del Museo Nacional de Arqueología, Historia y Etnografía*, 4ª época, VIII, fig. 3 (after p. 52).

[34] *Ibid.*, p. 56. Note that *A* sounds 448 vps. Written notes in fig. 3 call for an 8va-sign above them.

most of the teponaztlis discussed and photographed in *Anales del Museo* (4ª época, vol. VIII) look as smooth on top as a ballroom floor. However, one in the Museo Nacional, dubbed Macuilxóchitl, and another in the Toluca Museum[35] prove exceptions; their tongues rise midway from "floor" to "platform."

By striking the same "platform" key, first on one side of the platform and then on the other, two different pitches can be produced, claims one recent writer.[36] In the same breath, however, he states that the differing pitches of the two keys are determined by their differing lengths. Castañeda demonstrated in 1933 that this is not so.[37]

Sahagún does underline the versatility of the teponaztli family when he writes that on the night when captives impersonating the Rain Gods were to be slain, teponaztlis "croaked, growled, and droned," all in the same ceremony.[38] Another proof of their versatility is recorded in *Book IX—The Merchants*, chapter 10. According to the account in this book, a merchant did not reach the apex of his career until he could invite his peers to a banquet at which the choice viands were cooked slave. Not any slave would do, but only the ones who danced best to the sound of the teponaztli. Sahagún tells where and how such Nijinskys were found.

Slave dealers in the Azcapotzalco market place hired professional musicians to sing and play the teponaztli. These stirred up lively enough music to make even the most reluctant slave dance his best before the assembled crowd. The purchaser carefully considered which one to buy. He sought above all else a slave sensitive enough to keep exact time to the beat of the teponaztli; also someone handsome, with an excellent body. If a handsome slave danced well, he sold for a third as much again as a mediocre dancer. Upon getting the slave home, the merchant jailed him in a wooden box all night but the next morning took him out to start dancing in preparation for the banquet.[39] At the banquet the bathed slave was cooked in *olla* and served in tidbits with maize and salt, but without chili.[40]

The customary season of the year for millionaire merchants to indulge themselves in such conspicuous consumption was the fifteenth month, which came at around November 19–December 8. During this month, dedicated to the Aztec tutelar deity Huitzilopochtli, Panquetzaliztli ("feast of the flags") was celebrated. In another book, *The Ceremonies* (Anderson and Dibble, pp. 134–135 = *Historia General*, Garibay ed., I, 210.32–211.33), Sahagún describes in some detail the intermezzi preceding the final trumpet blast for the chosen victims. Having had all their hair cut off by the merchants grooming them for the grand finale when their hearts would become "precious-eagle-cactus-fruit," the bathed slaves proceeded to pirouette before Moctezuma. One of their entr'actes consisted of a staged battle. To make it lifelike, some real soldiers "wearing armor jackets of yellow cotton and carrying shields painted with wolf eyes" rushed into the fray. Against their pine swords, the slaves had little chance with no other weapons than stone-tipped bird arrows. Occasionally a slave did manage to fell an armed soldier, however. In such an event, the slave's reward sounded a musical overtone: his downed opponent was slung over a teponaztli. An expert sacrificer then wielded an obsidian knife to extract the heart of the weakling warrior. The blood that gushed into the inner resonance chamber of the teponaztli gave it new "life."

[35] *Ibid.*, VIII, 12–14 (lámina 3, right side, and fot. 8a—Macuilxóchitl), 654–656 (fot. 117).

[36] Samuel Martí, *Canto, danza y música precortesianos* (México: Fondo de Cultura Económica, 1961), p. 335: "Como las lengüetas son de diferentes longitudes, cada una produce un sonido, o dos cuando la lengüeta está dividida en dos secciones de diferente grosor." María de Baratta, *Cuzcatlán Típico* (San Salvador: Ministerio de Cultura, 1952), I, 87, gives CE as the two notes produced by striking the two tongues of a teponaztli in the Museo Nacional at San Salvador. "But Indian players sometimes hit the two ends of the cylinder, producing the notes FD♭ instead," she adds ("Los indios algunas veces acostumbran dar con los bolillos en las paredes laterales a las lengüetas, en ese caso, este tepunahuaste [teponaztli] del Museo Nacional da en las paredes laterales las siguientes notas: FaRebemol").

From observation of the depressions on museum instruments caused by hammer strokes, Juan Luis Franco Carrasco concluded that precontact players struck their teponaztlis customarily in three spots: at the tips of the two facing keys, and just above the intersection of transverse and lateral cuts.

[37] *Anales*, 4ª ép., VIII, 64–65.

[38] *Book 2—The Ceremonies*, chap. 25 (Anderson and Dibble, p. 83): "yn teponaztli, mjmjlcatoc, nanlcatoc, iuhqujn qujqujnacatoc."

[39] *Book 9—The Merchants*, pp. 45–46 (condensed) = *Historia General* (Garibay ed.), III, 43–44: "El tratante que compraba y vendía los esclavos alquilaba los cantores para que cantasen y tañesen el *teponaztli*. . . . Los que querían comprar los esclavos . . . al que veía que mejor cantaba y más sentidamente danzaba, conforme al son . . . luego hablaba al mercader en el precio del esclavo."

[40] *Book 9—The Merchants*, p. 67 = *Historia General*, III, 56.27.

tepuzquiquiztli

Defined by Molina (fol. 104) with no more than the laconic "trompeta," the *tepuzquiquiztli*, according to Rémi Siméon (*Dictionaire de la langue nahuatl* [Paris: Imprimerie Nationale, 1855], p. 453), was a "trompette en metal," and the root of the word is *quiquiztli* preceded by *tepuztli*, which he and Molina agree means *cuivre* = *cobre* = "copper."

At best, metallurgy arrived late in Mesoamerica. The Mayas lacked metal at the time the Bonampak murals were painted, nor did they know it except as an import much later.[41] What material did they use, then, for their trumpets that rival the hatzotzerah on the Arch of Titus for extraordinary length? Wood, according to one leading contemporary Maya authority.[42] So far as color is concerned, the four Bonampak trumpets—longer than a man's arm—are painted tan near the mouth. Halfway to the flaring bell the tan changes abruptly to a deep ruddy brown, possibly because two kinds of tropical wood join here. A black ring around the trumpet an inch or so from the lips suggests a mouthpiece. Twin trumpeters stand side by side in the twelve-man orchestra[43] shown in one mural. In another scene, depicting the tumult of battle, the trumpeters mix singly with the fighters. The paintings show the lips of the players always tightly pursed, with the trumpet itself jutting upward. Because of their material, the obsolete *Zink* would be their nearest European equivalent.

tetzilácatl

In an article published in 1901 Eduard Seler foresaw from archaeological evidence the possibility of identifying *tetzilácatl* as stone gongs.[44] Evidence for considering them as metal gongs can be found in one early written source, Alva Ixtilxóchitl's already mentioned *Historia Chichimeca*, in chapter 45 of which the tetzilácatl is described as a concave sheet of metal struck with a metal hammer and sounding very much like a bell.[45]

tlapitzalli

The first questions asked by a European-minded musician seeking parallels include these: (1) Were any transverse flutes known? (2) How many finger holes were available? (3) What was the mouthpiece like? Samuel Martí answered the first question with a qualified negative. Only one transverse flute has been discovered to date, he reported. This solitary example is of Gulf Coast provenience and belongs now to the Museo de Jalapa, Veracruz.[46] In answer to the second question, he points to the six finger holes cut in a 9½-inch-long decorated clay flute found on Jaina Island (east of Dzitbalché off the coast of Campeche State).[47] These give "a white-

[41] On the metal famine in Maya areas, see Diego de Landa, *Landa's Relación de las cosas de Yucatán*. ed. Alfred M. Tozzer (Cambridge, Mass.: Peabody Museum, 1941), pp. 18.104, 111.506. All precontact metal objects in Yucatán were imports from Tabasco, Honduras, and Nicaragua. Copper bells were the only metal musical instruments in the peninsula when Juan de Grijalva (1489?–1527) skirted its shores in 1518. "The money which they used was little bells [of copper]" at the time the Spaniards arrived; so reported the first native of Yucatán to learn both Spanish and Latin, Gaspar Antonio Chi (= Xiu, 1531–*ca.* 1610; son of a Maya priest, Xiu served as organist of Mérida Cathedral as late as 1596). See translation of Xiu's *Relación*, 1582, in Tozzer's ed. of Landa, p. 231 for confirmation (by Landa and Diego López de Cogolludo [1613–1665?]), of the use of copper bells as money, p. 95.418.

[42] J. Eric S. Thompson, "The Orchestra," in Karl Ruppert, J. Eric S. Thompson, and Tatiana Proskouriakoff, *Bonampak, Chiapas, México* (Washington: Carnegie Institution, 1955), p. 60.

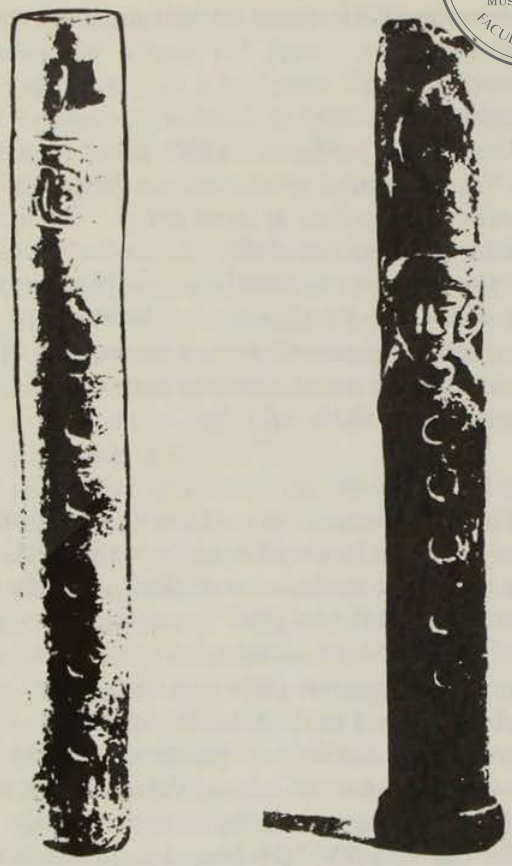
[43] Except for players of large huehuetl (tlalpanhuehuetl) and teponaztli, all are in a procession moving from left to right. As was noted above at page 2, the others include four ayacachtli players, another rattler, and three áyotl beaters. See inset in Samuel Martí, *Instrumentos musicales precortesianos* (Mexico: Instituto Nacional de Antropología, 1955), after p. 58.

[44] "Die Ausgrabungen am Orte des Haupttempels in México" [Mittheilungen der Anthropologischen Gesellschaft in Wien, Band XXXI (Dritte Folge, Band I), Vienna, 1901 [pp. 113–137]), republished in *Gesammelte Abhandlungen*, II (Berlin: A. Ascher u. Co., 1904), 890 (plate 93). Seler here discusses the votive instruments dug up December 13, 1900, on the site of the chief temple in Tenochtitlan. These were offerings to the 40-inch-tall vermilion statue of Macuilxóchitl (= Five Flower, god of games, amusements, and music) found in the same diggings (*ibid.*, p. 885). See also *Anales del Museo*, 4ª ép., VIII, 557.

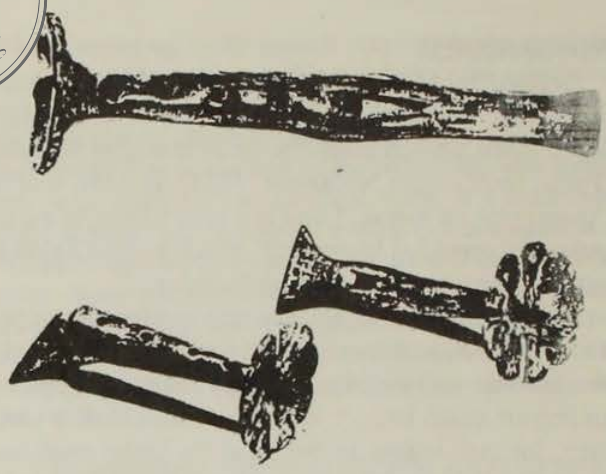
[45] Ixtlilxóchitl, *Obras históricas*, ed. Edmundo O'Gorman (1977), II, 127: "un artesón de metal que llamaban tetzilácatl que servía de campana, que con un martillo asimismo de metal le tañían, y tenía casi el mismo tañido de una campana."

[46] *Canto*, p. 341. Concerning transverse flutes in Inca territory, see Arturo Jiménez Borja, *Instrumentos musicales del Perú* (Lima: Museo de la Cultura, 1951), p. 45: "The museum of the University of Trujillo owns a Chimú vase showing a man playing a transverse flute."

[47] A principal center of Mayan art, Jaina fails of listing in *Webster's New Geographical Dictionary* (Springfield, Mass.: Merriam-Webster, 1984). But see "Jaina" in *Diccionario Porrúa, cuarta edición* (México: Editorial Porrúa, 1976), pp. 1102–1103. An island off the coast of Campeche, Jaina was a favored Mayan burying site from no later than 652 A.D. The



Two Mayan six-fingerhole clay flutes, Museo Nacional de Antropología e Historia, Mexico City, and Museo Regional de Villahermosa, Tabasco, 23.5 and 19.8 cm long. The first comes from Jaina island, Campeche. Both are dated *ca.* 500 A.D. Both were plugged at the top to begin with, but the top of the Tabasco flute is broken. The fingerholes of the National Museum flute are exactly spaced 1.5 cm from each other and below the mouth hole is an exquisite decoration 2.5 cm in width. The Tabasco flute is ornamented with a priest's head above the proximal fingerhole. At the distal end is a clay ornamental ring.



Aztec clay tlapitzalli, 16.3 cm long; 8 and 8.5 cm long. The two smaller flower petal flutes are at the Museo Nacional de Antropología e Historia, Mexico City, the larger in what was the Samuel Martí private collection (present owner unknown).

note diatonic scale of seven sounds, which is the most extensive found in [Mexican] archaeological instruments."[48] Much the more usual number of holes, even in Mayan flutes of the best period, must have been the four implied for the flute in the Dresden Codex, top of panel 34.[49] Aztec *tlapitzalli* (flutes), wherever found, obey the four-finger-hole rule—at least to judge from all the examples in *Instrumentos musicales precortesianos* (pp. 75, 83, 85, 89). When a "ceremonial flute" of human bone incised with five finger holes comes to light it proves to have been Toltec (p. 123, with the two lowest finger holes farther apart than the distance between the other holes), and when one of clay in the shape of a serpent and with five finger holes appears it is identified as Cultura Arcaica (p. 156). Apparently the Aztecs frowned as much on holes that to them were superfluous as the Spartans frowned on Timotheus's superfluous strings.[50]

End-notched flutes to match the *quenaquena* of Peru rarely turn up, and the authenticity of the few in museums is impugned. Vicente T. Mendoza bought an end-notched flute in November, 1934,

sixth- and seventh-century clay figurines and other hand modeled objects that include warriors, priests, ballplayers, and women are "small masterpieces of realistic art." The quality of Jaina art declined between 700 and 1000, during which period moldmade conventional animals and women replaced the earlier handmade figurines.

[48] *Instrumentos*, pp. 114 (color reproduction on facing plate), 116. Martí again reproduced the Jaina six-hole flute (Museo Nacional de Antropología) in Gertrude Kurath and Samuel Martí, *Dances of Anáhuac* (Chicago: Aldine Publishing Co., 1964 [Viking Fund Publications in Anthropology, 38]), p. 176.

[49] Reproduced by Seler in *Globus*, LXXVI, 111, and *Gesammelte Abhandlungen*, II, 701. Also by Martí, *Canto*, p. 49, and *Dances of Anáhuac*, p. 178.

[50] Even though the Timotheus anecdote is apocryphal (Oliver Strunk, *Source Readings in Music History* [New York: W. W. Norton, 1950], pp. 81–82), the analogy holds. Why four holes, and four only, in Aztec flutes? The four cardinal points and the center comprehended the entire Náhuatl universe, is the answer given by various Mexican organologists.

Four-hole flower flutes (at right held in owner's hand).

from an entrepreneur of local antiquities at Oaxaca. Made of human bone, it is pierced with six finger holes that permit emission of the following seven pitches, beginning a semitone above middle C: d♭, *d*♮, *e*♭, *f*, g, *b*♭, c.[51] Only the upper five notes of this series utter a pentatonic scale of the type that investigators such as Castañeda decreed to be characteristic of Aztec flutes. Two Tarascan clay flutes in the Museo de Morelia—both pierced with four finger holes and both ornamented at the mouth with gargoyles—produce whole-note scales of five notes.[52]

Did precontact flutists overblow and half-stop? Yes, answered H. T. Cresson, whose essay on "Aztec Music" published in *Proceedings of the Academy of Natural Sciences of Philadelphia*, Part I (1883, pp. 86–94), was one of the earliest on the subject. Given even a "pentatonic" flute, an amazing spectrum of pitches becomes available with these added techniques. As late as 1670 Francisco de Burgoa (1605–1681) continued to complain of the "out-of-tune flutes"[53] played by the natives to invoke their gods, before missionaries began instilling in them European pitch ideals. He could not have made a point of their *destempladas flautas* if they had been blowing, in simple and straightforward manner, nothing but innocent pentatonic flutes.

[51] Mendoza, "Tres instrumentos musicales prehispánicos," *Anales del Instituto de Investigaciones Estéticas*, VII (1941), 77. Photographs of this bone flute, front and rear views, are opposite.

[52] Martí, *Instrumentos*, p. 109.

[53] Francisco de Burgoa, *Palestra Historial* (México: Juan Ruyz, 1670; repr. 1934 [Publicaciones del Archivo General, XXIV]), p. 106 (chap. 13). Burgoa here discusses musical conditions in the Oaxaca region before the Dominicans entered upon their labors.

Pre-Aztec Flutes

Viewed from a European stance, the true glories among precontact blown instruments were the multiple flutes. One of the first triple flutes to receive careful attention was dug up at Tres Zapotes, Veracruz, by C. W. Weiant, in the same excavations that brought to light "the first and only" panpipe to have "turned up anywhere" in Mesoamerica.[54] Could Cortés have heard such exquisite music as this triple flute was capable of making, he would have lauded instead of condemning native music, opined Martí.[55] Even more exciting are the harmonic resources of a quadruple flute in the Diego Rivera collection. "We can assert that Mesoamerican instrument making reached its zenith with these extraordinary quadruple flutes," he wrote (p. 140), adding (p. 165) a table of ten chords obtainable from the Diego Rivera exemplar. Charles Lafayette Boilés, in his essay published in the spring of 1965, "La Flauta Triple de Tenenexpan," *La Palabra y el Hombre*, confirmed Martí's opinion that classical horizon multiple flutes marked the apogee of Mesoamerican organology.[56]

[54] C. W. Weiant, *An Introduction to the Ceramics of Tres Zapotes* (Washington: Government Printing Office, 1943 [Smithsonian Institution, Bureau of American Ethnology, Bulletin 139]), p. 111. His identification of the panpipe and his other musical remarks were corroborated by George Herzog (p. xii of Weiant's *An Introduction*). The panpipe is shown at plate 53, 13.

[55] *Instrumentos*, p. 134, Martí (*b* El Paso, Texas, May 18, 1906; *d* Tepoztlán, Morelos, March 29, 1975), who began his career as a concert violinist in the United States, emigrated to Yucatán in late 1935 (*Enciclopedia Yucatense*, ed. Carlos A. Echánove Trujillo [México: Edición Oficial del Gobierno de Yucatán, 1944], IV, 735). At Mérida he organized the Sinfónica de Yucatan that gave its first concert in the Teatro Peón Contreras December 1, 1936 Always straining for just those elements in aboriginal Mexican music which have the best chance of pampering European taste, he included *organum, gymel y discanto europeos* among its glories (*Canto*, p. 343) and listed among its features the "seven-tone scale similar to the European diatonic scale, the whole-tone scale, and three- and four-part chords" (Kurath and Martí, *Dances*, p. 172). For an exposé of Martí's grosser errors, see *Hispanic American Historical Review*, XLII/3 (August, 1962), 450–451.

[56] At page 217 of this landmark article, Boilés emphasized that the fourths are "well tuned" and at page 218 assured the reader that the Totonac instrument makers (who, some seven hundred years before the Spaniards arrived, baked this, and other multiple flutes) knew the harmonic series. Two tubes of this flute measure 18.5 cm, the other (bourdon) 27 cm. Like cantor, alto, and drone, the three tubes are respectively bored with three finger holes, two, and one. An added hole on the back side of the "cantor" tube serves as "transposition key" (*cambia-registro*, to use Boilés's term).

Because, however, these Gulf Coast multiple flutes, lauded by Martí, Boilés, and other collectors, belonged to a cultural horizon antedating by centuries the earliest Aztec incursions into the Valley of Mexico, any definitive study of their sound resources must in 1988 still await a more complete census of the exemplars now in private and public collections.[57]

[57] For data on West Coast of Mexico pre-hispanic instruments with no demonstrable Aztec connections, see Peter Crossley-Holland, *Musical artifacts of pre-hispanic Mexico: Towards an interdisciplinary approach* (Los Angeles: Program in Ethnomusicology, Department of Music, University of California, Los Angeles, 1980). This 45-page brochure is synopsized in *Handbook of Latin American Studies*, No. 44 (Humanities), ed. Dolores Moyano Martin (Austin: University of Texas Press, 1982), p. 604 (item 7089).

Select Bibliography

(for additional literature, see footnotes)

Alcalá, Fray Jerónimo de. *La Relación de Michoacán*, ed. Francisco Miranda. Morelia, Michoacán: Fimax Publicistas Editores, 1980.

Alva Ixtlilxóchitl, Fernando de. See Ixtlilxóchitl.

Alvarado Tezozomoc, Fernando. See Tezozomoc.

Anderson, Arthur J. O., Frances Berdan, and James Lockhart. *Beyond the Codices: The Nahua View of Colonial Mexico*. Berkeley, Los Angeles: University of California Press, 1976.

Ballesteros Gaibrois, Manuel. *Vida y obra de Fray Bernardino de Sahagún*. León: Institución "Fray Bernardino de Sahagún," C.S.I.C., 1973.

Baudot, Georges. "The Last Years of Fray Bernardino de Sahagún. . . . " In: *Sixteenth Century Mexico: The Work of Sahagún*, ed. Munro S. Edmonson. Albuquerque: School of American Research and University of New Mexico Press, 1974.

Bierhorst, John. *A Nahuatl-English Dictionary and Concordance to the 'Cantares Mexicanos' with an Analytic Transcription and Grammatical Notes*. Stanford, Calif.: Stanford University Press, 1985.

Díaz del Castillo, Bernal. *Historia verdadera de la conquista de la Nueva España*. 11th ed. México: Porrúa, 1976.

Dibble, Charles E. *Historia de la nación mexicana: Reproducción a todo color del Códice de 1576 (Códice Aubin)*. Madrid: José Porrúa Turanzas, 1963.

Diccionario Porrúa de Historia, Biografía y Geografía de México. 4. ed., con un suplemento. México: Editorial Porrúa, 1976. 2 vols.

D'Olwer, Luis Nicolau. *Fray Bernardino de Sahagún (1499–1590)*, translated by Mauricio J. Mixeo. Salt Lake City: University of Utah Press, 1987.

Durán, Diego de. *The Aztecs: The History of the Indies of New Spain*, tr. Doris Heyden and Fernando Horcasitas, with an introduction by Ignacio Bernal. New York: Orion Press, 1964.

———. *Historia de las Indias de Nueva-España e islas de la Tierra Firme*, ed. José F. Ramírez. Tomo I. México: Imprenta de J. M. Andrade y F. Escalante, 1867. *Atlas*. México: Imprenta de Ignacio Escalante, 1880.

———. *Historia de las Indias de Nueva España e islas de la Tierra Firme*, ed. Ángel M. Garibay K. Vol. 1: *Libro de los ritos y ceremonias . . .* and *El calendario antiguo*. Vol. 2: *Historia*. México: Porrúa, 1967.

Enciclopedia yucatense, ed. Carlos A. Echánove Trujillo. Tomo IV. México: Edición Oficial del Gobierno de Yucatán, 1944.

Florentine Codex. *See* Sahagún, *Florentine Codex*.

Gann, Thomas. "Mounds in Northern Honduras," in *Nineteenth Annual Report of the Bureau of American Ethnology, 1897–98*. Washington: Government Printing Office, 1900. Part 2, 655–692.

García Granados, Rafael. *Diccionario biográfico de historia antigua de Méjico*. México: Instituto de Historia, 1952–1953. 3 vols.

García Icazbalceta, Joaquín. *Bibliografía mexicana del siglo XVI*. México: Librería de Andrade y Morales Sucesores, 1886.

———. *Bibliografía mexicana del siglo XVI*, ed. Agustín Millares Carlo. México: Fondo de Cultura Económica, 1954.

———. *Colección de documentos para la historia de México*. México: Porrúa, 1971. Reprint of the 1858–1866 ed. 2 vols.

———. *Nueva colección de documentos para la historia de México*. México: Salvaldor Chávez Hayhoe, 1941. 3 vols.

Garibay Kintana, Ángel M. *Historia de la literatura náhuatl*. México: Porrúa, 1953–1954. 2 vols.

———. *Poesía náhuatl*. México: Universidad Nacional Autónoma de México, 1964–1968. 3 vols.

Gibson, Charles. *The Aztecs Under Spanish Rule*. Stanford, Calif.: Stanford University Press, 1964.

Hernández, Francisco. *Antigüedades de la Nueva España*, traducción de latín y notas por don Joaquín García Pimentel. México: Pedro Robredo, 1945.

———. *Historia natural de Nueva España*, tr. de latín por José Rojo Navarro. (Hernández, *Obras Completas*, parts 2 and 3.) Vol. 1: *Historia de las plantas*. Vol. 2: *Historia de las plantas* (cont.), *Historia de los animales*, and *Historia de los minerales*. México: Universidad Nacional Autónoma de México, 1959.

Ixtlilxóchitl, Fernando de Alva. *Obras históricas*, ed. Edmundo O'Gorman. [Tomo II: *Historia de la Nación Chichimeca*.] México: Universidad Nacional Autónoma de México, 1975–1977. 2 vols.

Karttunen, Frances. *An Analytical Dictionary of Nahuatl*. Austin: University of Texas Press, 1983.

León, Nicolás. *Los Tarascos. Notas históricas, étnicas y antropológicas*. México: Editorial Innovación, 1979. Repr. of 1903 edition.

León-Portilla, Ascensión H. de. "Algunas publicaciones recientes sobre lengua y literatura nahuas," *Estudios de Cultura Náhuatl*, vol. 14 (1980), 419–432.

———. "Bibliografía lingüística nahua," *Estudios de Cultura Náhuatl*, vol. 10 (1972), 409–441.

León-Portilla, Miguel. *Los antiguos mexicanos a través de sus crónicas y cantares*. 2. ed. rev. México: Fondo de Cultura Económica, 1972.

LORENZANA [Y BUTRÓN], FRANCISCO ANTONIO [DE]. *Concilios provinciales primero y segundo, celebrados en la muy noble y muy leal ciudad de México, presidiendo el Illmo. y Rmo. señor d. fr. Alonso de Montúfar, en los años de 1555 y 1565*. México: Imprenta de el Superior Gobierno, de el Br. D. Joseph Antonio de Hogal, 1769.

MARTÍ, SAMUEL. *Canto, danza y música precortesianos*. México: Fondo de Cultura Económica, 1961.

———. *Instrumentos musicales precortesianos*. México: Instituto Nacional de Antropología e Historia, 1955. 2d ed. rev., 1968.

MARTÍNEZ, JOSÉ LUIS. *El "Codice Florentino" y la "Historia General" de Sahagún*. México: Archivo General de la Nación, 1982. [Colección: Documentos para la Historia, 2.]

MÉNDEZ PLANCARTE, ALFONSO. *Poetas novohispanos, primer siglo (1521-1621)*, 2. ed. México: Universidad Nacional Autónoma de México, 1964. [Biblioteca del Estudiante Universitario, no. 33.]

MENDIETA, GERÓNIMO DE. *Historia eclesiástica indiana*. México: Porrúa, 1971.

MENDOZA, VICENTE T. *Panorama de la música tradicional de México*. México: UIniversidad Nacional Autónoma de México, 1956.

MOLINA, ALONSO DE. *Vocabvlario en lengva castellana y mexicana*. México: Antonio de Spinosa, 1571. Edición facsimiliada, ed. Julio Platzmann. Leipzig: B. G. Teubner, 1880. México: Porrúa, 1970. Facsimile of the 1880 ed.

MOTOLINÍA, [FRAY TORIBIO DE BENAVENTE]. "Historia de los indios de Nueva España," in *Colección de documentos para la historia de México*, ed. Joaquín García Icazbalceta, vol. I. México: Porrúa, 1971, 1-249. Reprint of the 1858 volume. Ed. Claudio Esteva Fabregat. Madrid: Historia 16 [Información y Revistas, S.A.], 1985.

———. *Memoriales o libro de las cosas de la Nueva España y de los naturales de ella*, ed. Luis García Pimentel. México: En Casa del Editor; Paris: A. Donnamette; Madrid: Librería de Gabriel Sánchez, 1903. Ed. Edmundo O'Gorman. México: Universidad Nacional Autónoma de México, 1971.

NOWOTNY, KARL ANTON. "Die Notation des 'Tono' in den aztekischen Cantares," *Baessler-Archiv* (Berlin), Neue Folge, IV/2 [XXIX. Band] (December, 1956), 185-189.

PEÑAFIEL, ANTONIO. *Cantares en idioma mexicano impresos según el manuscrito original existente en la Biblioteca Nacional*. México: Secretaría de Fomento, 1899.

———. *Cantares en idioma mexicano: Reproducción facsimilaria del manuscrito existente en la Biblioteca Nacional*. México: Secretaria de Fomento, 1904.

PÉREZ DE RIBAS, ANDRÉS. *Historia de los trivnfos de nvestra santa fe entre gentes más bárbaras*. México: Editorial Layac, 1944. (Originally published in 1645.) 3 vols.

RAMÍREZ, JOSÉ FERNANDO. *Fray Toribio de Motolinía y otros estudios*, ed. Antonio Castro Leal, 2. ed. México: Editorial Porrúa, 1957.

Relación de las ceremonias y ritos y población y gobierno de los indios de la provincia de Michoacán (1541). Reproducción facsímil del Ms. ç. IV. 5. de El Escorial. Text transcribed by José Tudela, preface by José Corona Núñez. Madrid: Balsal Editores, 1977.

RINCÓN, ANTONIO DEL. *Arte mexicana*. México: Pedro Balli, 1595; Secretaría de Fomento, 1885.

SAHAGÚN, BERNARDINO DE. *Códice florentino*. 3 vols. México: Secretaría de Gobernación, 1979.

———. *Florentine Codex: General History of the Things of New Spain*, translated from the Aztec to the English, with notes and illustrations by Arthur J. O. Anderson and Charles E. Dibble. In thirteen parts. Santa Fe, New Mexico: The School of American Research and University of Utah Press, 1950-1982. Book 1—The Gods, 1950 (2d ed., 1970); Book 2—The Ceremonies, 1951; Book 7—The Sun, Moon, and Stars, 1953; Book 8—The Kings and Lords, 1954; Book 10—The People, 1961; Book 12—The Conquest of Mexico, 1955.

———. *Historia General de las Cosas de Nueva España*, ed. Ángel María Garibay K., 2. ed. México: Editorial Porrúa, 1969. 4 vols.

———. *Psalmodia christiana, y sermonario de los sanctos del año, en lengua mexicana*. México: Pedro Ocharte, 1583.

SCHULTZE JENA, LEONHARD, translator. *Alt-Aztekische Gesänge*. Stuttgart: W. Kohlhammer, 1957. (Quellenwerke zur alten Geschichte Amerikas, vol. 6.)

SELER, EDUARD. *Gesammelte Abhandlungen zur amerikanischen Sprach- und Alterthumskunde*. Berlin: 1902-1923. 5 vols.

SIMÉON, RÉMI. *Dictionnaire de la langue nahuatl ou mexicaine*. Graz, Austria: Akademische Druck- & Verlagsanstalt, 1963. Reprint of the 1885 ed.

STEVENSON, ROBERT. *Music in Aztec & Inca Territory*. Berkeley, Los Angeles, London: University of California Press, 1968, 1976.

TEZOZOMOC, FERNANDO ALVARADO, *Crónica mexicana*. 2. ed. México: Editorial Porrúa, 1975. (Reprint of the 1878 ed.)

TORQUEMADA, JUAN DE. *Monarquía indiana*. México: Porrúa, 1975. (Reprint of the 1723 ed.) 3 vols.

———. *Monarquía indiana: Selección, introducción y notas*, ed. Miguel León-Portilla. México: Universidad Nacional Autónoma de México. 1964.

VELÁZQUEZ, PRIMO FELICIANO. *Códice Chimalpopoca: Anales de Cuauhtitlan y Leyenda de los soles*. México: Universidad Nacional Autónoma de México, 1945.

———. ed. *Huei tlamahuiçoltica [omonexiti in ilhuicac tlatocacihuapilli Santa Maria totlaçonanantzin Guadalupe in nican huei altepenahuac Mexico itocayocan Tepeyacac]: Libro en lengua mexicana que el Br. Luis Lasso de la Vega hizo imprimir en México el año de 1649*. México: Carreño & hijo, 1926.

WILKERSON, S. JEFFREY K. "The Ethnographic Works of Andrés de Olmos." In *Sixteenth-Century Mexico: The Work of Sahagún*, ed. Munro S. Edmonson. Albuquerque: School of American Research and University of New Mexico Press, 1974.

ZIMMERMANN, GÜNTER. *Die Relationen Chimalpahin's zur Geschichte México's*. 2 parts. Part 1: *Die Zeit bis zur Conquista 1521*. Part 2: *Das Jahrhundert nach der Conquista (1522-1615)*. Hamburg: Cram, De Gruyter & Co., 1965. (Universität Hamburg, Abhandlungen aus dem Gebiet der Auslandskunde, vols. 68-69; series B, vols. 38-39.)