

OF THE TERM MICROTONE:

MICROTONES. Fractional notes of less than quarter-tones, not a normal element in western composition, but used by the Mexican composer Julián Carrillo, who wrote music on a microtone system of his own and invented special instruments to produce the notes.

*Harvard Dictionary
of Music:*

Microtone. An interval smaller than a semitone. Long a structural feature of Asian music, the use of microtones in Western music, although far from new, has been—aside from traditional, empirical performance practice involving microtonal adjustment of intervals for expressive purposes—far less extensive. The enharmonic system of Greek music, which gained temporary importance in the period of Euripides (c. 480–06 B.C.), included *quarter tones [see Greece II]. Martianus Capella (fl. 4th to 5th cent.), in his *De nuptiis Mercurii et Philologiae* or *Satyricon* (Book ix, "De musicâ"), mentions third tones (*tristemoria*) and quarter tones (*tetrestemoria*) [see ed. F. Eyssenhardt (1866), p. 349; similarly Regino of Prüm, in *GS* i, 232, no. 4]. Several of the "ornamental" neumes of Gregorian chant probably involved quarter tones [see Neumes I]. There is incontestable evidence of the practical use of quarter tones in the 11th-century Gradual of Montpellier [see *WoHN* i, 44f; *ApGC*, p. 122f, pl. vi]. In the 16th century, the enharmonic system of the Greeks was revived by N. Vicentino [see Arcicembalo]. At the end of the 17th century, Christiaan Huygens proposed a division of the octave into thirty-one equal parts, permitting transpositions of the diatonic scales in just intonation.

The adoption of the equal-tempered twelve-note scale for keyboard instruments rendered such efforts as Huygens' supererogatory, and it was not until music began approaching a state of chromatic saturation that composers once again considered the introduction of microtones into the resources of Western music [see *Serial Music*].

In 1895, the Mexican Julián Carrillo wrote a string quartet using quarter tones [see *Sonido trece*]. Between 1903 and 1914 Charles Ives wrote a Quarter-tone Chorale for Strings. In 1907, Busoni was considering the use of third tones [see *Entwurf einer neuen Ästhetik der Tonkunst* 1906]. Ives used quarter tones in at least two other works, Quarter-tone Pieces for Two Pianos and his Fourth Symphony. Similar experiments were made in the first half of the 20th century by Hans Barth (Concerto for quarter-tone piano and strings, 1930), I. Vyshnegradsky (*Dithyramb*, 1926; Prelude and Fugue, 1929), and Alois Hába, whose extensive list of compositions includes works using both quarter tones and sixth tones. Both Carrillo and Harry Partch have written a considerable number of pieces using even smaller intervals, Partch dividing the octave into forty-three unequal steps, Carrillo, into ninety-six equal ones. Several Dutch composers (H. Badings, H. Kox, P. Schat, et al.), holding, like Partch, that further subdivision of the equal-tempered twelve-note scale merely compounds the harmonic errors inherent in it, have written

pieces using the 31-note scale advanced by Huygens and, in this century, by Adriaan Fokker. Recently, many younger composers, stimulated at least in part by *electronic music, have been using microtones to a considerable extent.

Notation of microtones, even in the case of the fairly commonly used quarter tones, has not been standardized. Perhaps the best known system is that established by Hába. His system for quarter tones is found in his String Quartet op. 12, no. 2 [Ex. 1]; for sixth tones, it is found in his String Quartet op. 87, no. 11 [Ex. 2]; another fairly common system for quarter tones is used by Krzysztof Penderecki in *Anaklasis*

(1959/60); see Ex. 3. One objection to these systems is that the symbols for the quarter and sixth tones are too easily misread for the conventional sharps and flats. Also, that used by Hába makes it impossible to use both sixth and quarter tones in the same composition, while that used in the Penderecki example makes no provision for sixth tones at all. One system that attempts to overcome these drawbacks prefixes the ordinary accidentals with $\sqrt{\quad}$ and $\bar{\quad}$ for quarter tones and $\sqrt{\quad}$ and $\bar{\quad}$ for sixth tones (Ezra Sims, *Octet for Strings*, 1964; see Ex. 3). There is also the special system devised by Carrillo for his pieces using sixteenth tones, in which numerical fractions replace conventional staff notation ("Preludio a Cristobal Colón," in *New Music* xvii, no. 3, 1944).

A few instruments for performance of microtonal music have been built. A quarter-tone piano was patented first in 1892 (G. A. Behrens-Senegalden). In 1924, Förster of Löbau/Georgswalde built a piano with two manuals, the second a quarter tone higher than the first; later, Hans Barth, in the United States, built a similar instrument [see N. Slonimsky, *Music since 1900*, rev. ed. (1949), p. 337]. In the Teyler Museum, Haarlem, there is an organ designed for performance of 31-note music [see R. Orton, "The 31-note Organ," *The Musical Times* cvii, 1966]. Both Carrillo and Partch have built special instruments for the performance of their music.

Comments by

Ivor Darreg:

It can be seen from these divergent definitions that there is no really standard meaning for the term *microtone*. It does not even appear in Webster's Collegiate Dictionary.

Note also that these articles do not mention the 17- or 19-tone temperaments which are approximately $1/3$ step. When this size interval is played to new listeners, they mistake it for an ordinary semitone, so it seems awkward to call the 17-; 18-; and 19-tone systems 'microtonal'—this is reaffirmed by the 1920's experiments of F. Busoni, as recounted in his essays.

The misinformation and confusion about non-twelve systems is so serious, that even scholarly works such as these dictionaries were not able to present accurate accounts. For instance, Christiaan Huygens invented the 31-tone system to make meantone tuning a closed circle rather than to realize just intonation, since 31 and meantone eliminate the comma, whereas just intonation makes the tiny interval of a comma 81:80 necessary, and very important.

The noticeably flat fifths of the 31-tone and meantone systems would never be mistaken for just fifths!

The word *tone* has too many meanings—not only in English, but in other major languages. The definition of *microtone* offered in Grove's Dictionary implies that one is to subdivide the whole-tone or whole-step of the 12-tone equal temperament as Hába and Carrillo did, rather than using divisions of the octave that are incompatible with the division into 6 or 12 equal parts.

This has had tragic consequences: in upholding the alleged sacredness of the 12-tone system's whole-tone or exactly $1/6$ octave, millions of musicians have been denied the opportunity to hear and use just, smooth, restful, beatless thirds and sixths, major or minor. It so happens that the 19-tone equal temperament provides excellent minor thirds and major sixths, while the 31-tone temperament excels in major thirds and minor sixths.

References in the Harvard Dictionary:

Lit.: A. Hába, *Von der Psychologie der musikalischen Gestaltung . . . eines neuen Musikstils* [1925]; *id.*, *Neue Harmonielehre* (1927); S. Waller, *Die Grundtheorie des Vierteltonsystems*, rev. ed. [1936]; J. Carrillo, *Sistema General de Escritura Musical* (1957); C. Ives, *Essays before a Sonata and Other Writings* [1962]; J. Yasser, *A Theory of Evolving Tonality* (1932); H. Partch, *Genesis of a Music* (1949); I. Vyshnegradsky, in *RM* 1937, no. 171; A. Wellek, in *MQ* xii; H. Carpenter, in *AM* xxxii (16th cent.); A. Holde, in *MQ* xxiv; L. Sabaneev, in *The Musical Times* lxx, 501; H. Kaufmann, in *JMT* v, 32; W. Berard, in *JMT* v, 95; C. Schmidt and D. Kraehenbuehl, in *JMT* vi, 32. E.S.

Percy Scholes, OXFORD COMPANION TO MUSIC

MICROTONES (p. 571, pl. 103. 5-7) are any intervals smaller than the semitone. During the late nineteenth and the twentieth century a good deal of experimentation has gone on in the use of microtones in composition.

G. A. Behrens-Senegaldens, of Berlin, in 1892, patented a quarter-tone piano and published a pamphlet on quarter-tone music.

The Moravian Aloys Hába has written quarter-tone music for string quartet and for small orchestra, and also for quarter-tone harmonium and quarter-tone piano; in 1931 he produced a quarter-tone opera. He has also used sixth-tones and has published a book on microtonic composition, demonstrating the value of third, fourth, sixth, and twelfth tones. Some of his orchestration demands the use of quarter-tone clarinets, trumpets, &c.

The German R. H. Stein has written for a quarter-tone piano and a quarter-tone clari-

net; his earliest quarter-tone music dates from 1906.

The Italian Gncchi in 1910 wrote a quarter-tone opera, *La Rosiera*.

The Mexican Carrillo has composed music based on quarter, eighth, and sixteenth-tones, and has constructed instruments on which to play it and a special notation; the conductor Stokowski, of Philadelphia, appeared in 1927 as champion of his music (see *Carrillo*).

The Swiss American composer Ernest Bloch has introduced quarter-tones into the string parts of his piano quintet.

The Englishman J. H. Foulds has used quarter-tones. His wife, Maud MacCarthy, the violinist, who has studied Indian music, once broadcast a lecture in which she sang up and down the Hindu scale of twenty-two notes to the octave. The present writer tested her on the piano on starting, on reaching the upper octave, and on returning, and found her perfectly accurate. Dr. Ernest Walker reports that during a lecture at Oxford she performed the same feat, undisturbed by the tolling of Great Tom, the big bell of Christ Church. It is said, however, that Hába can go farther than this, having brought himself, by assiduous practice, to the point where he can accurately sing five divisions of the semitone, i.e. sixty in the octave. This demonstrates that musicians' ears can be trained to the recognition of microtones, but whether the ears of the general public would ever feel the difference between deliberate microtones and mere out-of-tune performance is another matter.

Dr. Moritz Stoehr of New York built a quarter-tone piano in 1924. Quarter-tone harps and guitars have been heard.

The Russian Vischnegradsky, of Paris, is one of the several inventors of a quarter-tone piano and has written quarter-tone music for string quartet, &c. The Russian Lourié has also composed quarter-tone music. Hans Barth, of New York, has made a quarter-tone piano, and in 1930 played a concerto of his own on it with the Philadelphia Orchestra; the American Charles Ives has written music for Barth's programmes.

This list could be lengthened, but it is enough to show that there is a good deal of activity in the microtonic field.

It should be remembered that the idea of microtonic composition is far from new. It was apparently much discussed in the seventeenth century in England, for in Christopher Simpson's *Compendium of Practical Musick* (1667) we read, 'I am slow to believe that any good musick (especially in many parts) can be composed in Quarter-Tones, although I hear some talk much of it.'

As early as that the principle of microtones was in some small measure instrumentally recognized. Simpson mentions the 'splitting of some keys in Harpsichords and Organs, as also the placing of a Middle Fret near the Top or Nut of a Viol or Theorbo, where the space is wide.'

But this was merely to provide alternatives (as G sharp and A flat) in the days before Equal Temperament (see *Temperament* S).

BY IVOR DARREG:

The 22-tone scale from India, mentioned above, is *not* the same as the 22-tone equal temperament. Their moods are different, and besides that, the traditions in India are such that no-one would dare use all their unequal

twenty-two pitches per octave in the same composition.

The systems with fewer tones have an entirely different effect from those with more than 24 tones per octave, which means that there should be proper terms to show this important distinction. The unit interval of the 31 or 36 system does not have the melodic effect that the unit interval of the 17 or 19 system will have.

The 24- and 36-tone systems, or quartertone and sixth-tone as they are generally known, contain the ordinary 12 notes and therefore do not and cannot improve the effect of the major and minor thirds and sixths. For this reason, they retain the harsh, restless mood of the 12-tone system.

Since the added notes all make *unfamiliar intervals* with the old 12, there is no inducement to try playing any existing music with the aid of these extra additional pitches. This constitutes a formidable road-block to musical progress, all the worse because it is *hidden*.

Otherwise stated, the added pitch-classes are strangers, not integrated with the previous twelve.

The solution to this problem is in the use of tuning-systems not tied to either 6 or 12. We recommend 17, 19, 22, 31, 34, 41, 43, 46, 50, 53, . . . for compositions based on harmonious chords and/or a tonality or key-system.

For atonal music or for melody where harmonic considerations need not be reckoned with, there are many more systems: 5, 7, 9, 10, 11, 13, 14, . . . as far as you care to go!

The possible *unequal* tuning-systems are legion, and just beginning to be explored. In addition, there are innumerable selections to be made from *just intonation*.

The practice of *tone-bending* and the violinists' sharpening of most leading-tones indicate a subconscious desire to escape the tyranny of the 12-tone keyboard.

So there is no need to confine oneself to any rigid system: non-twelve is the road to freedom.

Most of these new systems still admit of *tone-bending* and accommodation to certain conventional instruments (e.g. violins).