Music is a form of human communication as ancient as language itself. Like written language, the need for a more reliable system of music communication was felt very early in history. Until very recently, the vast majority of music belongs to some form of oral tradition. It was passed from one performer to another by repetition and memory. Having no manner of visual notation, pieces of music changed their character through the ages. Systems of signs and symbols for writing music developed alongside written language as the need to pass along consistent information presented itself.

Very little is known about the ancient music world, and notation systems are virtually unknown to us. It is likely that the ancient Sumerians and Egyptians devised symbols to accompany the system of hand signs they used to indicate the pitch, tone, and shape of the melody. The Chinese had a quite sophisticated system of notation as early as the 3rd century BC. These early systems consisted of either symbols to represent separate vocal syllables—a form of solmization; or signs and instructions for playing specific instruments—a form of tablature.

The use of letters of the alphabet to name notes of the scale dates back to ancient Greece and possibly earlier. This system was well established by 500 BC. Soon after, letter names were given to whole tones of the diatonic scale, and inflections of a semitone or even a quarter-tone could be expressed by rotation of the letter symbols. Two different systems of letters were used to write down the instrumental and the vocal music of ancient Greece. In his five textbooks on music theory, Boethius applied the first 15 letters of the alphabet to the notes in use at the end of the Roman period. Also, their system was capable of indicating rhythmic value, a complexity that did not reappear until well into the middle ages.

We have no written music after classical antiquity until the ninth

Greek musical notation on a funeral column. The notation begins above the sixth line of the inscription.

Manuscript from St. Gall 359, ninth century. This is an example of early neumes, the major form of notation for medieval Europe.
century. By the Middle ages, Christianity was the driving force behind any social or artistic advances. In sixth and seventh century Ireland, monasticism flourished, contributing to the history of art and design with manuscripts like the Book of Kells and the Lindisfarne Gospels. It was also responsible for the founding of the monastery of St. Gall in central Europe, where a large number of early manuscripts of notated music were produced.

A form of notation using signs called neumes had developed as a means of writing down plainsong. These graphic signs showed the rise and fall of the notes of a melody, but did not give a precise idea of pitch or rhythm. These neumes indicated only the grouping of sounds in a given melody, evidently to remind a singer the approximate shape of a melody already learned by ear. Neumes developed into a complex system in which an individual neume could represent a single note or as many as four notes in a particular sequence. While this system widely varied throughout the different parts of Europe, but the fundamental characteristics remained the same.

When Charlemagne was crowned emperor in 800, he made it his duty to unify all of his realm. Part of this was to stabilize the liturgies of the church. As religious practices greatly varied from region to region, he sought to create a standard that would be consistent throughout his Holy Roman Empire. Chant was an important piece of any Christian worship service, and the communication of a stable repertoire throughout the vast territory of the empire required a standardized system of musical notation. He standardized the neume system, which was still only intended to remind singers of relative melodies that they had already been taught.

Heighted neumes, neumes whose pitch relationship is represented on the page in the tenth century. This variation in notation made the intervals of a melody more discernible, but was still not designed to inform people of melodies that they had never heard before. The neumatic system gave a very graphic indication of the shape of a melody, but the addition of a horizontal line removed its main drawback by fixing an absolute

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Pitch
The position of a tone in the musical scale, today designated by a letter name and determined by the frequency of vibration of the source of the tone. An international conference held in 1939 set a standard for A above middle C of 440 cycles per second.

Tone
A tone is distinguished from noise by its definite pitch, caused by the regularity of the vibrations that produce it. Any tone possesses the attributes of pitch, intensity, and quality. Pitch is determined by the frequency of the vibration, measured in cycles per second. Intensity, or loudness, is determined by the amplitude, measured in decibels. Quality is determined by the overtones (subsidiary tones), the distinctive timbre of any instrument being the result of the number and relative prominence of the overtones it produces.

Solmization, Solfege
Systems of vocal exercises employing a series of syllables originally devised by the Benedictine monk Guido d’Arezzo (c.990-1080) for the purpose of vocalization and sight-singing. These solmization syllables are now commonly known in the form do, re, mi, fa, sol, la, si (or ti), do.

Tablature
Non-note based systems of musical notation using letters, numbers, or symbols to indicate pitch and duration of tone. Tablatures are used today to notate music for guitar and ukulele. These have vertical lines representing strings of the instrument, horizontal lines for the frets, and dots to show the position of the fingers.

Scale
Any series of tones arranged in a step-by-step rising or falling of
pitch as a point of reference.

Soon after the use of a single line to represent an absolute pitch came about, two lines were adopted. The lines represented the pitches of C and F and were often drawn in different colors. These two pitches were most important because they represented the beginning and middle of an eight note scale. Below the F and C lines there were sometimes written the letters E and A to indicate respectively, the placement of those two unruled pitches.

Guido of Arezzo further improved the system of notating plainsong in the first half of the 11th century. As well as inventing his own version of solmization, he also suggested the use of a stave of four horizontal lines, which would not only provide a pitch reference, but would also graphically represent relative pitch by the vertical placing of notes on its lines and spaces. He is also placed the letters C or F in their appropriate places at the beginning of each line, further refining the accuracy of the system. The letters evolved into the clef signs used today.

Guido's innovations were, however, all concerned with notating pitch, and it was not until the 13th century that any systematic reform of rhythmic notation was achieved. The first to tackle this was Franco of Cologne, who codified and rationalized the existing system, and established the relationships between different note values.

A system similar to present-day rhythmic notation had evolved from this by the middle of the 15th century, but based on triple rather than duple divisions. At first, certain patternings of neumes were used to represent the various rhythmic modes; later, in his Ars cantus mensurabilis (c.1280), Franco of Cologne created a clear indication for each note of its exact rhythmic length and selected certain neumes to represent tones of long and short duration. In his system, the long value was in principle equal to three of the short values. These refined versions of neumes were called ligatures, because of their appearance as individual notes that had been tied together.

pitch. The scale most used in Western musical composition until the end of the 19th cent. was the diatonic scale, a series of seven tones. (The addition of a final top note, with a frequency twice that of the lowest note, defines this sequence as an octave.) The intervals of the diatonic scale were defined by Pythagoras in the 6th cent. B.C. as five whole tones and two semitones. By the time of J.S. Bach, the chromatic scale of 12 equal semitones (as in the white and black keys of a keyboard scale) had become established, and the scales beginning on these notes, the basis of Western tonality. The pentatonic scale of five whole tones is prevalent in Asian music.

Whole Tone
The interval of a major second, as in moving from one white key to the adjoining white key on the piano.

Semitone
The interval of a minor second, as in moving from a white key to the adjoining black key on the piano.

Quarter Tone
An interval less than a minor second. Generally not found in Western music.

Boethius
(Anicius Manlius Severinus Boethius), c.475-525, Roman philosopher and statesman. A consul (510) in Rome, he became minister under Emperor Theodoric, but was falsely accused of treason, imprisoned, and sentenced to death. His treatise on ancient music was for many centuries the unquestioned authority on Western music.

Plainsong
All early unharmonized melody in free rhythm, but usually synony mous with Gregorian chant, the
This missal for Rome use c.1476, is one of the earliest examples of music printing. It characterizes roman notation with square notes, sparse ligature, and a five line staff. The square C clef is used throughout. Any color used in the book (red, blue, and yellow) was added by hand.

This manuscript from Passau, ca 1489 with diamond shaped notation, rich in ligature, with a four line staff, characterizes gothic notation. The C clef is seen throughout.
Mensural notation, in which each note has a specific time value, became a necessity with the development of polyphony. In the 14th cent. Philippe de Vitry, author of Ars nova, which expands the system of Franco, codified the duple divisions of the long and short notes. At the various rhythmic levels of a given piece, a rhythmic relationship was implied. This was shown graphically by different combinations of a dot inside a circle or half circle. Not coincidentally, the symbols for Perfect Tempus, or 9/4 time and Imperfect Tempus, or 6/4 time are the same alchemical symbols used at the time to represent Gold and Silver, the perfect and near perfect metals. Both 9/4 time and 6/4 time were considered preferable in music. The modern symbol for common time or 4/4, may have also derived from this form of rhythmic notation, which was a half circle with no dot in the center.

In addition to these time signature symbols, a system of signs and colored notes developed for indicating which relationships were in use or were being temporarily altered.

These alchemy symbols for gold and silver are the same as those for Perfect Tempus and Imperfect Tempus, respectively. The correlations between the disciplines are not surprising. The Music of the Spheres was the term given to the harmonies or dissonances of the planets in motion. All of the universe was theorized to operate on musical terms.

Liturgical music of the Roman Catholic Church. Texts are taken from the mass, the bible, and hymns.

Rhythm
Basic element of music concerned with the duration of tones and the stresses or accents placed upon them. The formulation in the 12th century of basic rhythmic patterns (modes) led to the development of meter, the division of a composition into units of equal time value.

Charlemagne
(742-814) The first Christian emperor of the Roman Empire, Emperor of the West (800-814), and Carolingian King of the Franks (768-814).

Chant
General name for one-voiced, unaccompanied liturgical music, usually referring to melodies of the Orthodox, Roman Catholic, and Anglican branches of Christianity. Its melodies, unlike the Roman Catholic plainsong, are harmonized.

Clef
A symbol prefixed to a five-line stave indicating the pitch range to which the written notes apply. The C clef is now comparatively rare, except for viola, cello, and bassoon; for most other instruments the G and F clefs are standard.

Polyphony
Music which contains more than one composed part at a time. Early chant, though sometimes sung by many voices, contained only one part.
This piece from Mikrokosmos by Bela Bartok shows basic modern notation as we know it today. As the printing process got more refined, so did the symbols used in notation.
In the 15th century, numbers with the appearance of fractions, indicated that one proportionality of rhythmic values was temporarily being substituted for another. Modern signatures evolved from these numbers. Bar lines, expression signs, and Italian terms to indicate tempo and dynamics came into use in the 17th century. With the adoption of equal temperament and the major and minor modes, signatures indicating a major key or its relative minor became conventional. By about 1700, the modern system of notation, using a stave of five lines as opposed to the four used in plainsong, had become firmly established. A stave of five lines for vocal music was adopted in France and one of six lines in Italy. Signs for chromatic alteration of tones appear almost from the beginning and had assumed their present shapes by the end of the 17th century. The essential problems in pitch notation, the use of both lines and spaces to indicate successive scale degrees and the use of extra symbols such as accidentals were solved comparatively rapidly. Eventually the modern version of music notation was established with the help of widespread music printing practices. Despite its drawbacks, particularly in notating non-diatonic pitches and complex rhythms, conventional modern notation is also being used outside of Western music. Music of previously oral traditions is being transcribed, and even classical traditions such as Chinese music now make use of Western notation.

The history of music notation is one of continual evolution, and the 20th century is no exception. As composers have found new means of expression, they have developed new means of writing them down. Methods of indicating microtones, intervals less than a semitone, were found early in the century, and symbols borrowed from mathematics have been used to notate complex rhythmic relationships. Some composers, such as John Cage and Karlheinz Stockhausen, virtually abandoned conventional notation in favor of graphic representations or even passages of text; others, such as Pierre Boulez and

**Dynamics**
Symbols indicating relative loudness, changes in loudness such as crescendo and diminuendo, or loudness in accentuation such as rinfanzando.

**Accidentals**
Symbols used to raise or lower a tone by a half step or more. Sharps, flats, double sharps, double flats, and naturals are accidentals.
Luciano Berio, have attempted to refine it and improve its accuracy. There have even been attempts, particularly in the first half of the century, to invent completely new systems, but these have not been enthusiastically received.

Graphic representation of sounds that began with medieval plainchant originally aimed at recording the real inflection of a singing voice. In 1940 Villa-Lobos composed New York Skyline based on the outline of a photograph projected onto graph paper and thence to music manuscript. Percy Grainger’s proposed Free Music Machine 1948, applies optical sound principles on a larger scale, a technique continued in digital synthesizers today. Development of the sound spectograph in 1944 by engineers at Bell Telephone Laboratories introduced a much improved projection of audio events in pitch and time. Much of modern day electronic music is composed with graphic representations of sound on computer screens.

Musical symbols, as with any form of graphic communication, is ever-changing. With the advent of global communication
and technology, advances in non diatonic music, and acceptance of non western musical traditions, the musical symbol will adapt to the needs of society, as it has done through the ages.

Sources


