CHAPTER 1

A Brief History of Music Notation

History doesn't repeat itself, but it does rhyme.
Mark Twain

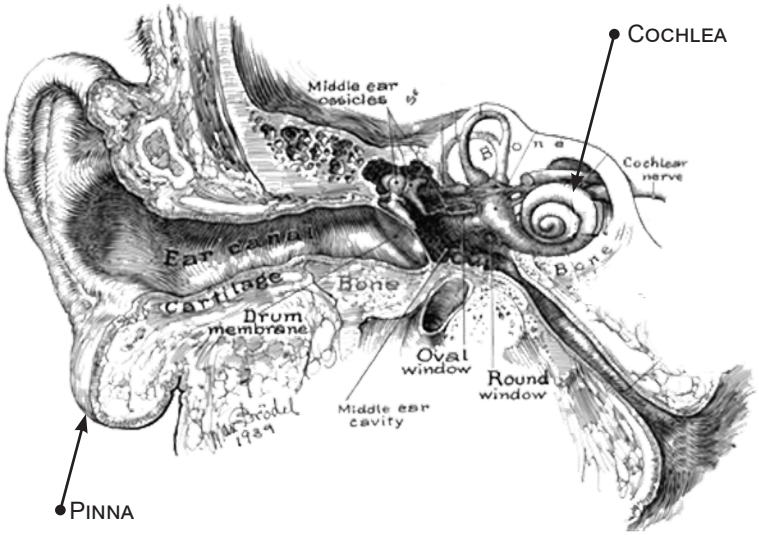
Hear, There, Everywhere

When you hear something you like, thank a fish. About five hundred million years ago fish began to develop the ability to sense vibrations, but not with anything we would call an ear. Amphibians improved on the fishy system with sack-like organs containing clumps of neurons devoted only to sensing vibrations, much like the ears frogs have today. Birds evolved the design even further.

With the exception of moths, the ear has reached its peak with mammals and the appearance of pinna, the fleshy outer ear that funnels sound to the cochlea, one of the many tiny pieces of the inner ear. The cochlea converts the vibrations into nerve impulses and sends them to the brain where it gets processed by systems like the cortical fugal network.

It had to take over a hundred million generations of critters to evolve an ear capable of hearing the ecstasy of Bach's *B Minor Mass*, the groove of the blues or the blistering Bebop of Charlie Parker.

With this wonderful ability to hear, it's no surprise that we humans began to organize sounds into patterns of rhythm and pitch. That's music. A question that will remain unanswered forever is what the first instrument was. Some say drum, some say voice, but we'll never know for sure. Maybe it was something completely different. Flutes made from the bones of a vulture were found in Europe that appear to be at least 40,000 years old.



Magical Powers of Music (aka Psychology of Music)

From the very beginning, music was linked with magic and shamanism, and still is. Wherever you find a shaman, you'll probably find a drum.

Music has magical powers. It can transport you into an altered state, heal sickness, purify the body and mind, and work miracles in nature. In the Old Testament David cures Saul's madness with a harp, and the walls of Jericho were brought tumbling down by horns.

David & Saul, by Rembrandt, c.1658

You may scoff at such primitivism, but do it softly and don't let anyone hear you. Recent discoveries are showing that such ideas are not so cracked as they seem. Don't believe me? Okay, here are some examples:

Imagine. It's night. A cavern begins to fill with creatures that normally keep distance between themselves and the others of their kind. They rarely touch. Tonight, because of sound, they will experience an altered state of being.

Soon there will be ten thousand of them. Then twenty thousand. Thirty. More. Tonight they will crush together and dance to the music. On a raised platform, anywhere from three to a dozen or more people stroke or bang on or breathe into instruments that produce complex rhythms and pitches. The sound causes us humans to behave in a way that's different from the everyday norm, especially if we really like the band.

Here's another scenario. You've had a long hard day and you arrive home exhausted. At home loud and annoying music plays—something you really hate, like your dad's vinyl Barry Manilow, or your kid's Megadeth Live! mp3—and it grates and grinds on your nerves.

Once it's turned off, you heave a deep sigh and a peacefulness settles over you. You put on some of your favorite music—say that Barry Manilow record, or maybe that rockin' Megadeth Live! CD—and the relaxation deepens.

Music therapy has shown positive results in those undergoing cardiac rehabilitation, and drug rehabilitation. Music has also helped sufferers of asthma, depression, high blood pressure, migraines and ulcers. Music can help with the production of melatonin, an important chemical in the body. The use of music therapy in healing has gained much credibility and its use is increasing as we test music's effects empirically.

There's more: Ella Fitzgerald breathes deeply, begins a note and holds it. She sings with power and confidence and clarity. The note is high and clear. A tall empty champagne glass sits on a stool nearby and begins to vibrate with her voice. Ella's voice grows louder. The glass begins to tremble. Then it explodes in a shimmering cascade of shards.

Jane Goodall, the famous chimpanzee expert, relates a story about a chimp who discovered that

banging two empty gasoline cans together makes a terribly wonderful racket. In a few days of banging the chimp had become the dominant male of the group. A percussionist's dream. There is power in sound.

How long has music been around? Nobody really knows, but we all suspect it's been with us from the beginning.

To the left is a picture of 35,000 year old mastodon bones with markings for resonance points (places where it sounds really good to hit). This bone xylophone was found with two bone flutes.

Use your imagination to think about what the very first musical experience was. You have about as much chance being correct as anyone, and it's fun to imagine.

Being the creatures that we are, it was only a matter of time until we developed a written language that could record these rhythms and pitches so that others could make them too.

Just like with language, music existed for a long, long time before it was written down, and some think music may have existed before spoken language. Music was taught by rote, which means copying what another has played or sung. No need to read music, just listen carefully and copy the sounds, the fingerings, or whatever. It's a method that takes a lot of time but works well and many, many people all over the world still learn this way. But with a system of writing music, a song can be shared with an audience far away, played by a musician who can read the lines and squiggles created by someone she has never met.

Writing Down the Bones

Our western tradition of written music—what you're about to learn—has only been in existence a thousand years or so and that's not very long in the grand scheme of things. Although it should be obvious, the Western classical music tradition is only one of thousands of different traditions of music, most of which have no use for writing down sounds, and some musical traditions actively discourage written music. However, the Western system for reading and writing music has become pretty useful and widespread.

There are older traditions of written music, too. Ancient Hindus and then the Greeks made use of their alphabet to write out music; the Persians used numbers and a kind of staff with nine lines between which the numbers were written; the Chinese used special signs for their pentatonic scales. The earliest examples of written music come from musical notation on fragments of a stone tablet found in Garit, Syria, dated to around 1200 BC.

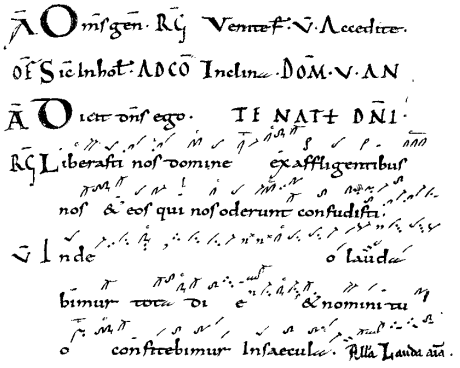
Over a thousand years later, around 500 AD, comes the first glimmer of written Western music. Because Western notation evolved in Greek and Latin-speaking cultures that read from left to right, music is also read from left to right, and top to bottom. Boethius, a Roman poet and philosopher, wrote an important treatise on music in the early 6th century, *De institutione musica*. His treatise was re-published in 1492 and was studied during the Middle Ages by monks throughout Europe.

In the treatise, Boethius used Latin letters to represent musical sounds. Monks in the monasteries of the Catholic Church studied this treatise by Boethius and improved upon his ideas for their own system. After a few hundred years, in addition to letter names for notes, monks invented a system of neumes—pronounced nooms—meaning *sign* in Greek. Neumes are squiggly bits written above the text of a song that show note length, pitch, and movement from one note to the next.

After a while, neumes began to be written on, above, or below a single line. The line represented a

specific pitch. A neume written above the line was higher in pitch than a neume written below the line. Around 1,000 CE, many innovations in written music came about, but it isn't exactly clear who invented them. Guido di Arezzo is given most of the credit. He was a Benedictine monk who was thrown out of his monastery for his radical innovations in music. It's believed that he didn't actually *invent* the staff, but contributed when he increased the lines from two to four.

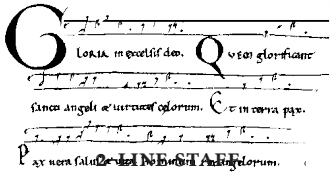
We're lucky he got kicked out of the monastery because it caused his ideas to be spread more widely. After he had an audience with the Pope who recognized Guido's skill, his monastery wanted him back.



9th century manuscript with neumes written above the Latin text

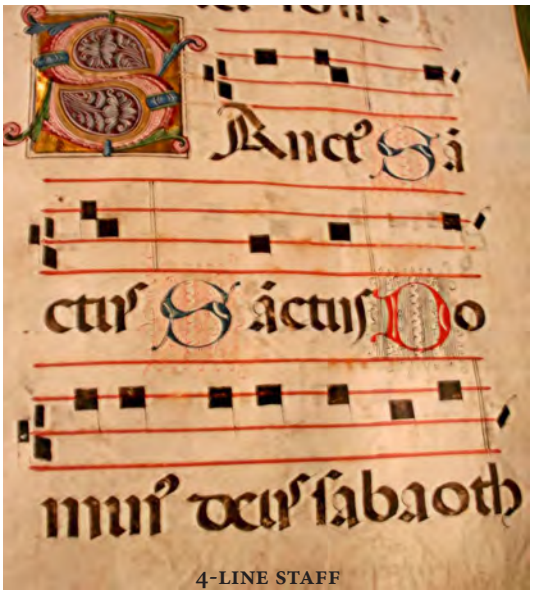
Guido di Arezzo was definitely responsible for adding more lines to the staff, and he was also thought to have invented the Guidonian Hand, a system for singing together. He would point to specific places on his upraised hand, each corresponding to a specific note. This allowed a large number of monks to sing together. The picture to the left shows the notes from low to high, starting with the thumb. The picture at the beginning of the chapter is another example of the Guidonian Hand with staff lines.

For a long time, music in the monastery was monophonic, which means it had only one part, usually vocal. All of the musical examples that survive from this time come from the church. Of course, there *were* popular secular musicians around at the time, making music, but they weren't writing down what they played and so there is almost no record of it. The oldest written secular music in existence is *Sumer is Icumen In*, a song celebrating the coming of summer, also known as the *Cuckoo Song*.



12th century BCE

One example of monophonic music is a type of song called a plain chant. Some of the first examples of written western music are plain chants. They sound more like inflection than singing and are still used in Roman Catholic churches today. Eventually all those monks got bored with singing one-line music and began to add other parts. Music in the monastery was becoming more complex, and the written notes needed to reflect that complexity.



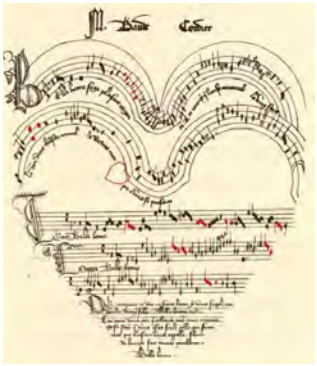
4-line staff

Music with more than one part is called polyphonic music. Polyphonic music soon became popular in the monasteries, but was difficult to write out.

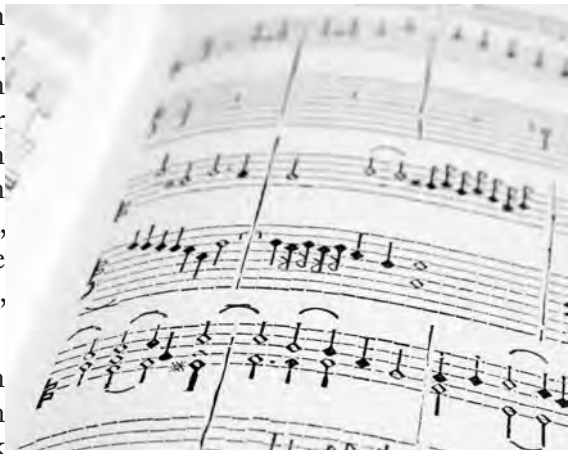
Because polyphonic music is more complex than monophonic music, it was necessary to add more lines to show the other voices. This is where Guido di Arezzo comes in. He expanded the staff to four lines, like the example to the left. Soon after, a fifth line was added.

Over the next five hundred years, composers experimented with different systems of writing music. It was written in elaborate shapes, like the heart-shaped love song on the next page, *Belle, bone, sage*, written by Baude Cordier in the 15th century. You can't see it in the print edition of this

book, but some of the notes are colored bright red. Color was sometimes used to alter written notes. Red notes get a different rhythm than uncolored notes.

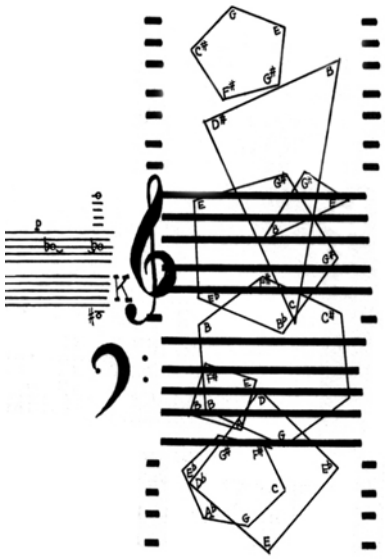


Experimentation also included an 8-line staff, like the one shown below, paired with a four-line staff. By about 1500 we arrived at the system (no pun intended) that has remained nearly unchanged until today.

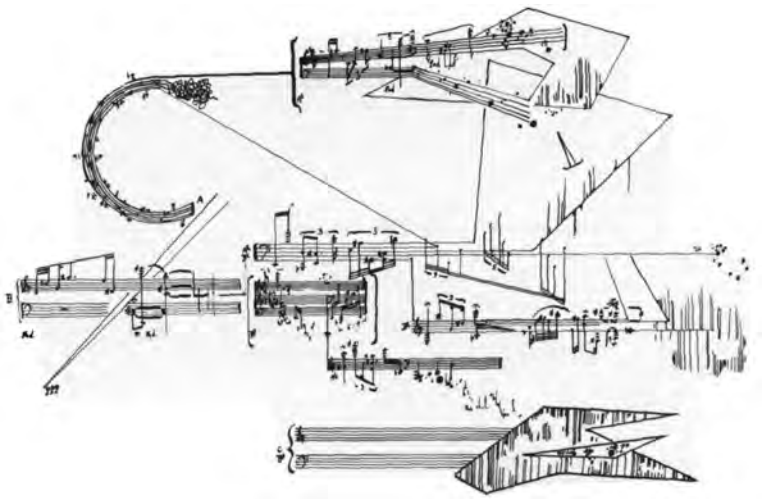


The spirit of experimentation with written music still exists. Modern composers like John Cage, William Maginnis or Stephen Reich use notation that is radically different from what you'll learn in this book, as you can see below. However, those composers *do* make use of most of the musical elements you're about to learn, like clefs, lines, and rhythms.

Music, like any language, evolves over time. Maybe in another thousand years we'll be reading music based on smells. Who knows? What do you think music will look like and sound like in another thousand years?



Portion of John Cage's Piano Concerto



portion of *Extension No. 1* by William R. Maginnis