



## Timbre

Our new music element, timbre, is a French word pronounced ‘TAM ber’. Timbre is an extension of soundwaves which explores deeper into the wave patterns of a single sound.

Another term for timbre is ‘tone colour’ which explains why a flute sounds different from another instrument (i.e. has a different ‘colour’), even when the same note is played and the cycles per second are identical.

The previous article on soundwaves should be kept in mind when we discuss timbre — you can access it (and all the music articles) from the link at the end of this article if you wish to reread it.

### The harmonic series pattern

In God’s design of a single soundwave we see an amazing pattern which only God could have created. This pattern is called the **harmonic series pattern** because all the notes in it are in harmonic agreement with a base note called the **fundamental**. I call the notes above the fundamental ‘God’s

secret hidden notes’ because that’s exactly what they are. God put them there and the untrained ear does not pick up these subtle, hidden notes. Technically they have several names.

1. **Overtones** because they are higher than the fundamental.
2. **Harmonics** because they are in harmony (i.e. agreement) with the fundamental.
3. **Partial tones** because they are smaller parts of the complete soundwave.

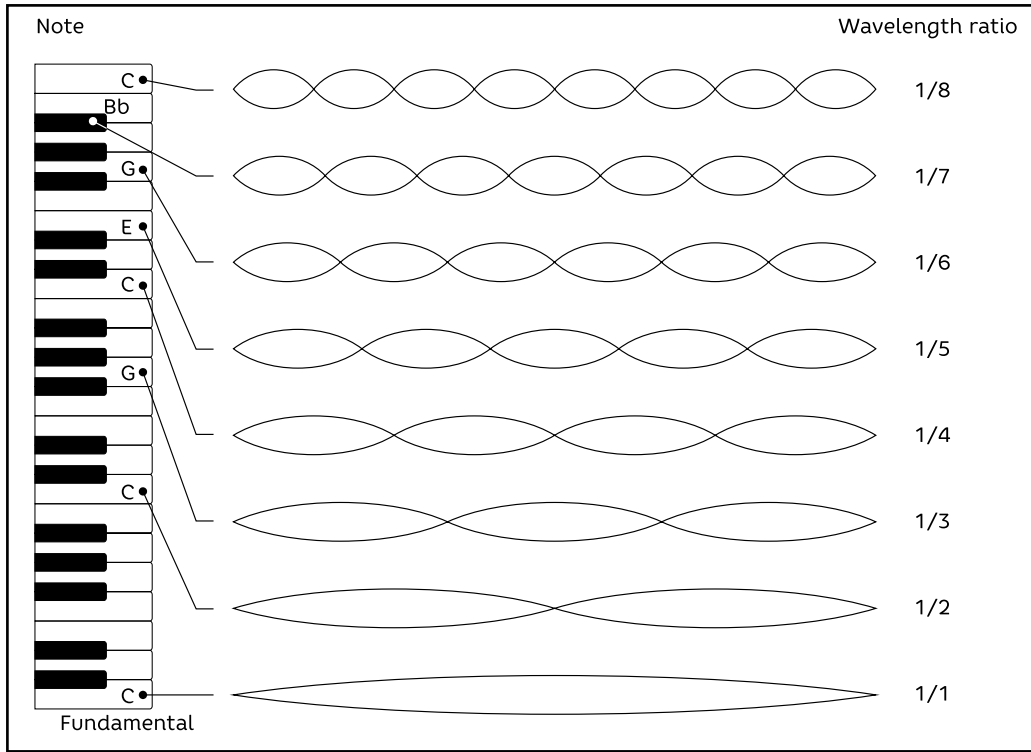
In this article we will call them ‘overtones’.

I apologise if this gets a bit technical, but please bear with me because timbre reveals how awesome our God is in His miraculous creation of soundwaves.

So — what is this harmonic series pattern? In the soundwaves article we learned about the cycles which form a wave, and the pitch of a note depends on its number of cycles per second.

When you halve the length of a string, the note will sound exactly one octave higher. This note is the first overtone, when the string vibrates at exactly twice the number of cycles.

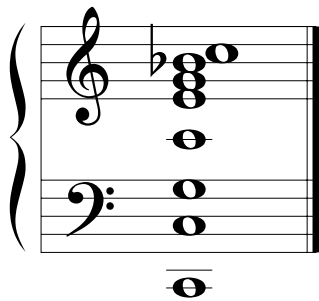
The overtones continue up the scale as the string vibrates at three, four, five, six, seven and eight times the number of cycles from the fundamental. And they keep going up until they fall outside the range we can hear. The first eight overtones formed by exact divisions of the string are shown on this chart. Together they form the harmonic series pattern.



The full soundwave for the note C is actually a combination of the fundamental C and all its overtones of C, G, C, E, Bb and C.

The untrained ear just hears a low C. However with practice, we can learn to discern a few of the overtones above it. The figure below shows the harmonic series pattern on the music staff.

The same ratios apply to every single note in the scale including the sharps and flats. On a wind instrument where there is no string, the length of string becomes the column of air.



### Undertones

A fascinating feature of God's design of soundwaves is that, as well as overtones, a fundamental note also has undertones! Undertones were discovered in 1745 by an organ builder called Sargene, who must have had a very finely-tuned ear. This was

an important discovery for organ builders because they could put in stops which used the undertones and saved them from building extremely long pipes for very low notes. Isn't God an awesome God in His design of the humble soundwave which we take for granted? This is evidence of a Creator God. No

man can create the soundwave design. He can only manipulate the God-made sounds.

### Different sounds

Now that we understand some basic physics of soundwaves, let's go back to our element of timbre and the question 'why does C on a flute sound different to C on the violin or piano?' It is simply because of the strengths of certain overtones. On a flute some overtones come out stronger than others within the full soundwave. On a violin, other overtones sound stronger. On a piano different overtones sound stronger. But they all sound the same pitch.

The implications of this are enormous. It explains why people have different timbre or tone colour in their voices. We can usually tell who is speaking on the phone just by the timbre of their soundwaves. Each voice and instrument is unique. Timbre is like a fingerprint, voiceprint or signature which identifies the owner. No two are the same — like snowflakes. God has left His own mark or signature in the diversity of His creation. He owns us because He created us and has left His signature in His design of us.

### Character

Timbre or tone colour is essentially about character, whether a person or an instrument. Human characters differ because each person has hidden parts, some being stronger than others. Some individuals are more patient, other are more diligent, gentle, grateful, joyful or honest. Yet others

are more lazy, impatient, selfish, gloomy, or dishonest. The hidden parts make a person or instrument unique.

The tone of a person's voice in vocal soundwaves reveals much about their emotional state — whether angry, annoyed, disrespectful, calm, happy, peaceful or worshipful. A composer chooses specific instruments according to their timbre or character so as to best express his musical ideas. A symphony orchestra employs a vast range of timbres within its many instrumental families — strings, woodwind, brass and percussion. Manipulation of soundwaves in electronic instruments also creates enormous variety of timbre. The choice of instruments ultimately reflects the composer's own character just as God's creation reflects His own character.

### Definition and God-message

In the light of all the above, we can now form a definition of timbre.

Timbre is the harmonic series pattern hiding inside a soundwave which makes an instrument or voice unique.

Timbre teaches some extremely important messages about its Creator God:

1. God designed soundwaves and people with unique characters.
2. God's signature can be seen in the design of His creation.
3. God identifies and knows everyone and wants us to know Him.

Timbre is intricately linked with all other music elements. For example, it is the

basis of harmony. Notice that the first six overtones of the fundamental C form the C chord. Harmony is about agreement and these notes (C, E and G) sound good together because, scientifically, they are the lowest part of the strong foundation of the harmonic series pattern. The seventh chord is found in the first seven notes. 9th, 11th and 13th chords also work well because they are part of the harmonic series pattern.

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The design of the humble soundwave and its timbre is a reflection of God and people. God is the fundamental and people can be likened to the overtones related and joined with Him. In music, there is one fundamental with many notes just as there is one God with many people. The closer we are to the fundamental, the stronger and more harmonious (agreeable) we become in our relationship with God. God knows us intimately and wants us to know Him. Matthew 10:29–30 tells us God knows every hair on our head. Jesus said in John 10:14, ‘I am the good shepherd and know my sheep and am known of mine’ and again in John 10:27, ‘My sheep hear my voice and I know them and they follow me.’

## Instruments and voices

When we think of timbre we often overlook the voice as an instrument. However a closer look at the voice will put instruments into perspective. The voice is the only instrument God built into us as a part of His design. Every other instrument is man-made, costs money, needs tuning and must be carried around. The voice is God-made, free, doesn’t need tuning and is easily transported. The voice is God’s preferred instrument for man.

Throughout musical history we see instrumental music dominating. Instruments are simply an extension of our bodies in that they respond to how we play them. It is very easy to make an instrument into an idol. As a young music student I did exactly that for many years. The piano became my means of escape from situations I could not handle. My family was not a singing family so I was never confident with my voice. The piano became my emotional release and means of expression without having to use words. I always felt better after piano practices but it was a false and short-lived sense of comfort.

Today we still see many instruments idolised by their players and it is too easy for ego and self to surface and dominate the music. The instrument distracts us from the true purpose of music which is an extension of spoken language and a part of our worship and communication with God. Where ego dominates, player and instrument become one and the voice may need to shout or even scream to be heard.

So many students study for music exams and practise endlessly. There are no words of praise to God here — the constant focus is on the sounds produced on their instrument. It is a purely emotional and intellectual experience. Ezekiel summed it up beautifully about 2500 years ago when he said, ‘And lo, thou art unto them as a very lovely song of one that hath a pleasant voice and can play well on an instrument: for they hear Thy words but they do them not.’ Playing an instrument brilliantly does not indicate obedience and worship to God.

We try to justify instrumental music by saying it is ‘training for the brain’, especially classical music. Sadly God is not often a part of our music-making. Music, self and the instrument are the focus. God told Habbakuk,

Of what value is an idol since a man has carved it? Or an image that teaches lies? For he who makes it trusts in his own creation. He makes idols that cannot speak. Woe to him who says to the wood, ‘Come to life.’ Or to a lifeless stone, ‘wake up.’ Can it give guidance? It is covered with gold and silver. There is no breath in it. But the Lord is in His holy temple. Let the earth be silent before Him.’

*Habbakuk 2:18–20 NIV*

We must not make idols out of our wood, metal, gold and silver musical instruments.

## Church music

The element of timbre raises many sensitive issues. Should instruments be used in church? Do we really need instruments in

church? In the 1500s Luther said ‘yes’ and Calvin said ‘no’. Could the money spent on them be put to better use for missionary work and spreading the gospel? Can we get away with simple worship using just a keyboard of some sort? Should we sing acapella only? Listening to the beautiful singing of Cook Islanders without instruments shows this is certainly possible.


Unfortunately many of us have been trained from childhood to depend on instrumental accompaniments and have lost confidence in our voices. And what about all the beautiful classical music of the so-called great composers written over the centuries? Where does this fit into God’s plans for music? We need to find out why the works were written to find the answers. Was God part of their motivation? Did they acknowledge Him? Or was composing just their income, and passion and instruments their idols?

Oh dear! So many questions arise out of this simple music element of timbre. We need to ponder and make decisions about the use of instruments. I am not giving any answers but leave it up to you to find out more and decide where you stand. Or maybe it is easier just to leave things as they are and not rock the boat, especially in our churches.

## Conclusion

I end on a positive note by saying that I have been privileged to hear the timbre of some most beautiful voices in church which, even though untrained, were still

natural, devoid of ego, showed clear diction, were soft and unforced, melodious, in tune, harmonious, worshipful and reflecting the beautiful melodious voice of Jesus and His love. The characters of the singers are revealed in the timbre of their voices. One can hear the humility and selflessness in the gentle purity of their tone colour. Oh how I long to hear the sounds of the angels singing in heaven. That WILL be something! And yes, we will be given golden harps to play – so I'm sure there will be a place for some instruments.

For further information on instruments please see the article *Should my child learn an instrument?* available from the link below. 

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and music articles by Wendy Hill](#)