



About The Author **C. ALEXANDER CLABER**

Alex first picked up a bass when studying engineering at university, and his quest for sonic perfection led him to found Barefaced Audio, while also leading The Reluctant, an alt-ska/funk outfit.

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But This Goes to 11...

Welcome to the world of bass rigs.

Does Tone Matter ... I Mean Really?

At the end of the day – or to be more precise, at the start of the gig – what really matters is the music. So is the tone you create merely for you to enjoy or does it affect the actual music itself? Well, if we step away from the world of bass and consider vocalists instead, I think anyone would agree that some people have voices that are not only pleasing to listen to but also move them emotionally. Indeed, some of those voices may not be pleasing in the conventional sense (revisiting Chris Cornell's double-tracked banshee wail an octave above his depressing growl on 'Superunknown' yesterday I was clearly reminded of the ugliness in some beauty – to quote Francis Bacon, 'There is no excellent beauty that hath not some strangeness in the proportion'), but they connect with the listener, making them feel sadness, joy, melancholy, anger, optimism etc ... In the hands of a master the violin and the electric guitar both have a similar vocal emotional impact, but so too can any instrument, right down to something as superficially simple as a didgeridoo or a djembe.

Just As You Can Sing, You Can Bang Out A Rhythm ...

So if one aspect of our instrument is its melodic timbre, the other aspect is its percussive beat. Ethnomusicologists believe that the very first instrument is likely to have been two sticks of wood being banged together rhythmically. Picture the situation, rewinding from the interplanetary spaceship drifting by to the balletic Strauss in 2001, back to our genetic precursors discovering the value of sticks for hitting other apemen in a competing tribe. And while testing a small stick for its homicidal efficacy by banging it on a log, one of these hirsute gentlemen notices it makes a nice sound. So he hits it on there again and again, and eventually

notices that if the pattern is repetitive it makes him feel happy. So he shows his friend who has a larger stick, and he makes fewer but heavier hits, and then he finds someone else who has a medium-sized stick with a crack in it and who starts hitting it on two and four (well, it would be two and four if they'd invented counting), and before you know it everyone's having a groovy party and no one's killing each other.

And Two Tuned Sticks A Xylophone Does Make ...

This could then have progressed into multiple tuned pieces of wood with different fundamental pitches, thus developing melody as well as rhythm. It was literally millennia before two pitches were played simultaneously, thus developing polyphony, and even through the Middle Ages this harmony was restricted to two parts, usually just fifths and ninths. The groove within music is believed to connect with the other side of the brain to the melody within music, both having an emotional impact but in different ways. Of course, one cannot disconnect melody from rhythm because melody has to have rhythm – the timing of the notes is an innate part of the melody – but despite that the melody does tend to affect us in a different way to the underlying groove.

The Bridge Between Melody, Rhythm And Harmony

I'm not the first person and I won't be the last to refer to the bass guitar (or double bass or tuba or keyboard bass or even sequenced bass – it's about the role, not the instrument) as this. And just as its function is triplicate, so too is its tonal contribution – because you cannot have music without tone.

We have the singing tones of the bass, when we double a vocal melody, or play counterpoint off it (Jamerson did this all the time, sneaking vocal-inspired fragments into the bassline), or play a big riff in unison with the other instruments; we have the rhythmic pulse of the bass, be it as simple as Cliff Williams's constant eight-note thud on 'Hells Bells', or as complex as Bootsy's syncopated sixteenth-note dancing on 'Give Up The Funk' or Les Claypool's slap lunacy on 'Tommy The Cat'; and finally we have the critical harmonic function of the bass – as Sting once said, it's only a C if he plays a C on the bass.

Part 1 – Melody

As I may have mentioned a thousand times before, although our instrument is tuned very low, with the lowest fundamental on a standard 5-string having a pitch of 31Hz, the bulk of the tonal content of the instrument is actually made up of the harmonic overtones plus the percussive transients. If we look at a violin, bowing the open bottom string we see the

Harmonic	Frequency (Hz)	Energy (%)
1	196	0.1
2	392	26.0
3	588	45.2
4	784	8.8
5	980	8.5
6	1176	4.5
7	1372	0.1
8	1568	4.8
9	1764	0.1

following distribution of energy: And a violin actually has a large enough body to appropriately support its lower frequencies, unlike the double bass which isn't sufficiently scaled up (as that would make it impossible for

'If you're wanting to be able to move fluidly around the mix, then excessive EQ can lead to you being boxed in.'



a normal-sized human to play!). When it comes to melody our ears very much latch onto those frequencies that dominate the male and female voices, and curiously the range of frequencies that are characteristic for each vowel sound do not vary with the pitch you're singing – counter-intuitive but true! So although one might think that a certain overtone is the characteristic sound of an 'o' or an 'er', actually the overtone changes but the frequency stays roughly the same. If we look at a soprano voice

Harmonic	Frequency (Hz)	Energy (%)
1	308	9
2	616	6
3	924	69
4	1232	8
5	1540	5
6	1848	1
7	2156	0
8	2464	0
9	2772	0

singing an 'a' sound we see the following distribution of energy:

And then we have a bass voice also

Harmonic	Frequency (Hz)	Energy (%)
1	154	1
2	308	3
3	462	1
4	616	1
5	772	12
6	924	66
7	1078	7
8	1232	7
9	1386	1

singing an 'a' sound but, unsurprisingly, an octave lower:

Further research has shown that regardless of the vowel sound being sung, or the register in which it's

Speech sound	Low frequency (Hz)	High frequency (Hz)
u (pool)	400	800
u (put)	475	1000
o (tone)	500	850
a (talk)	600	950
o (ton)	700	1150
a (father)	825	1200
a (tap)	750	1800
e (ten)	550	1900
er (pert)	500	1500
a (tape)	550	2100
i (tip)	450	2200
e (team)	375	2400

'Is the tone you create merely for you to enjoy or does it affect the actual music itself?'

being sung, a range of frequencies are consistently strengthened: It is these key mid-range areas that the melodic side of our brain latches on to when it appreciates melodies – so not only do all solo instruments have significant content in this sonic area, but all support instruments need to produce sufficient content in this area if we want to engage those same emotional receptors. Conversely, when working in a support role while another instrument (or indeed a vocalist) is providing the melodic focal point in the music, we need to keep clear of this sonic area so we do not mask the melodic instrument. This is where the great bands and session musicians have repeatedly demonstrated their talent, in their ability to sonically step forward, backwards or sideways as the music demands.

Power Is Nothing Without Control

Since about 1980 some of our bass amps have been festooned with knobs and sliders giving you more control of EQ, distortion and compression than you can shake a percussive stick at. This is all well and good if you know what you're doing with it – you don't have to twist all the knobs! However, if you're wanting to be able to move fluidly around the mix, then excessive EQ can lead to you being boxed in and unable to either express yourself through your instrument or keep out of your band mates' way when you're not the centre of attention (about 99% of the time for many bassists!). When you're singing through your instrument, your tone needs to sing just as much as the notes you're playing – and when you're not 'singing' you need to leave space for whoever is 'singing'. There's only one melodic ball most of the time, so everyone needs to keep passing it – don't hog the ball, don't drop the ball and never never have multiple balls on the pitch at the same time ... unless it's part of some cunning plan!



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