STEREO MIXING: THE ART, THE SCIENCE, THE FICTION

PART IV: PANNING

In this two-part exploration of stereo panning techniques, Andy Stewart resuscitates the mixing tutorial concept last spotted in Issue 69, and explores how panning helps recreate three-dimensional space.

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It's a big wide world – the world of stereo panning – both literally and metaphorically. Surround sound is immeasurably more complex, of course, but for now let's discuss what takes place between two speakers only. Before I begin I must stress that whatever is explored in this article represents only a small fraction of the ideas you can apply to panning. Personal exploration and experimentation are the true keys to the art of mixing, and the best teachers are you and the speakers in front of you. Think laterally, listen, imagine, and trust your instincts for what sounds right. Don't forget, you've grown up in physical space all your life, so you know more about panning than you perhaps realise.

In this first installment of a two-part investigation, we'll be looking at panning in the physical sense: how it helps create the illusion of space and time, and how it affects the scale of a mix. Next issue we'll explore other panning fundamentals and delve into the creation of more radical effects-oriented techniques. For now though, let's look left and right… horizon bound.

PANNING FOR GOLD

To me, panning is one of the most powerful tools in a mix engineer's arsenal. It may seem obvious to say this, but before stereo, there was no such thing as positioning a sound in the space between two speakers. In fact, even after stereo entered the picture there was *still* no such thing, only a switch that sent a channel's signal to left, centre or right.

So what is stereo panning all about and how does it figure in a stereo mix? Well, I should pause here for a moment and ask you to go outside and ponder this question yourself. The answers are literally everywhere, and analysing the world around you and *how you react to it*, is a great way to learn how placement works in combination with tone, reverberation, and dynamic range.

'SEEING' IS BELIEVING

Not always, but often, I like to mix with my eyes as much as my ears. I'd like to think there were countless situations where this concept doesn't really apply, but the more I mix, the more I find myself imagining the space in front of me. To me, building a mix is like painting a large picture, though not always. There are things in the background, characters in the foreground, lesser information at the corners of the canvas, things presented in stark focus, others less so and so on. Next time you're in the great outdoors, note that information at the extreme edges of your vision tend to be out of focus, and louder sounds naturally encourage you to turn and face them.

PHYSICAL REALITY

Fundamentally, stereo panning is about placing a sound in a context, and that context is, in this case, our two speakers. What's really happening to an audio signal when it's panned is that more, equal amounts, or less of its voltage is being sent to the left or right speaker, creating *the illusion* that sound is coming from the far left, the far right, the middle, and so on. A guitar, for example, panned left-of-centre in a stereo image is simply coming out of the left speaker at a greater volume than the right; pan it centre and it's coming from both speakers equally. Particularly in this second instance, if you had to point to where the instrument was in the stereo image, you'd point to the space in between the two speakers where no speaker exists – the 'phantom centre'.

To that extent, all panning is an illusion. With this in mind, let's explore some physical spaces and look at how panning helps propagate this illusion.

BLUE MOUNTAINS BOUND

If mixing, for you, is fundamentally about creating a balanced three-dimensional world for your audio signals to inhabit, imagining that space from the outset is very important. Your early vision for it may evolve into something else later, of course, or be overrun by a stronger idea that occurs to you midstream, but imagining how the space you've chosen might behave if it were real is a good place to start.

Let's say the task at hand is mixing a conventional rock song. A good thing to consider early on is how large the space will ultimately be that the overall mix is trying to occupy. Typically, the more sounds there are, the bigger that space will need to be – though not always. The way a song is recorded might also determine how you pan the signals, but whether it's a tight, dry and airless room you're looking to generate, or an epic Blue Mountains landscape, the sooner you decide this the better. Either way, choose your physical illusion wisely, in sympathy with the story the music is telling, but remember, if you have 100 people standing in front of you – and you want to see them all – your approach to panning is going to be quite different to if there had only been five or six (more on this shortly).

Okay, so let's say we're going for the 'Blue Mountains' option. I've heard the vocal, listened to the lead break and am inspired to go for broke! There aren't 150 sounds that need accommodating between the speakers but nevertheless I want an epic soundscape. The decision is made, and it feels good…

CREATING A FOCUS

Time for some quick decisions… though these don't necessarily need be set in stone quite yet. For the moment, the key is to remain open: to suggestion, to accidents, to ideas – any spark that will help trigger the illusion of space. First up, let's decide on our fundamental focus. I'm going to say it's the main vocal at this point (surprise, surprise) and pan this mono source dead centre right from the get-go, along with the bass guitar and kick drum, as per convention, and so that my bottom-end is being played by two speakers pushing and pulling in unison. Panning the focus elements dead centre also appeals to the listener on an unconscious level because almost anyone who focuses on a sound in the physical world will simultaneously turn (or attempt to turn) towards it, so the sound source is symmetrically positioned directly in front of them. (There's no time to go into detail here about the physiology of this phenomenon, but simply stated, the desire of the brain to focus on a sound triggers the body to turn towards it – so that eyes and ears are front and centre.) Other instruments in my mix are two electric guitars and an acoustic, along with a tambourine, a keyboard drone, two BVs of the fairer sex, and several other incidental percussion and string-based instruments.

I'm not sure what to do with the guitars just yet but my early instinct is to pan the two electrics to about 8.30am and 3.30pm on the pan pots (about 87% on the DAW panners – more on why I'm not pushing them out to 100% in a moment). I'll keep the acoustic guitar in the middle for now, it being the odd one out and one of three guitars. Incidentally, all these stringed instruments have been recorded with two mics, and they've not been submixed, which means I have the option of panning them in different ways, or not.

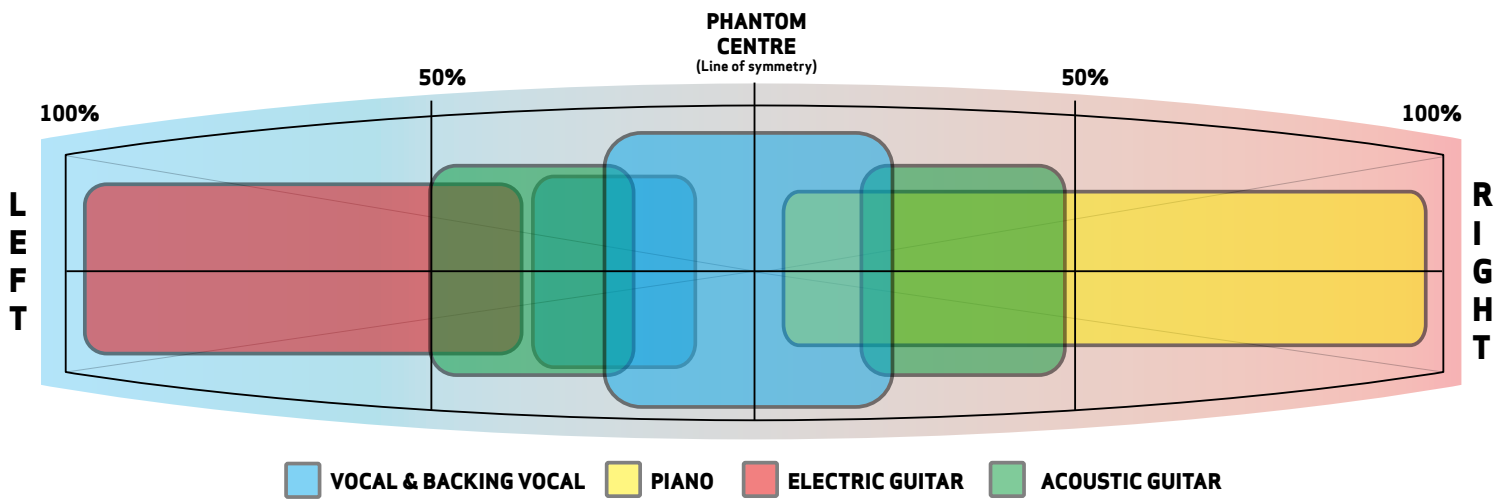
As things progress I settle on the panning of the electrics, and pan the stereo acoustic mics to about 10am and 2pm (about 40% on the DAW). One of these has slightly more bottom-end than the other, making the image seem slightly lopsided in favour of the brighter mic, and being obsessed with stereo balance – which we all should be – I endeavour to close the tonal gap between them a bit with EQ tweaks before finally deciding to pull the brighter mic in a tad.

Lots of other things are addressed during the course of the day, including the lead guitar break: the close-amp mic channel of which is panned centre with its room mics panned 60% left and right, and its level comparable to that of the vocal, befitting its focus – the other electrics are still playing during the solo.

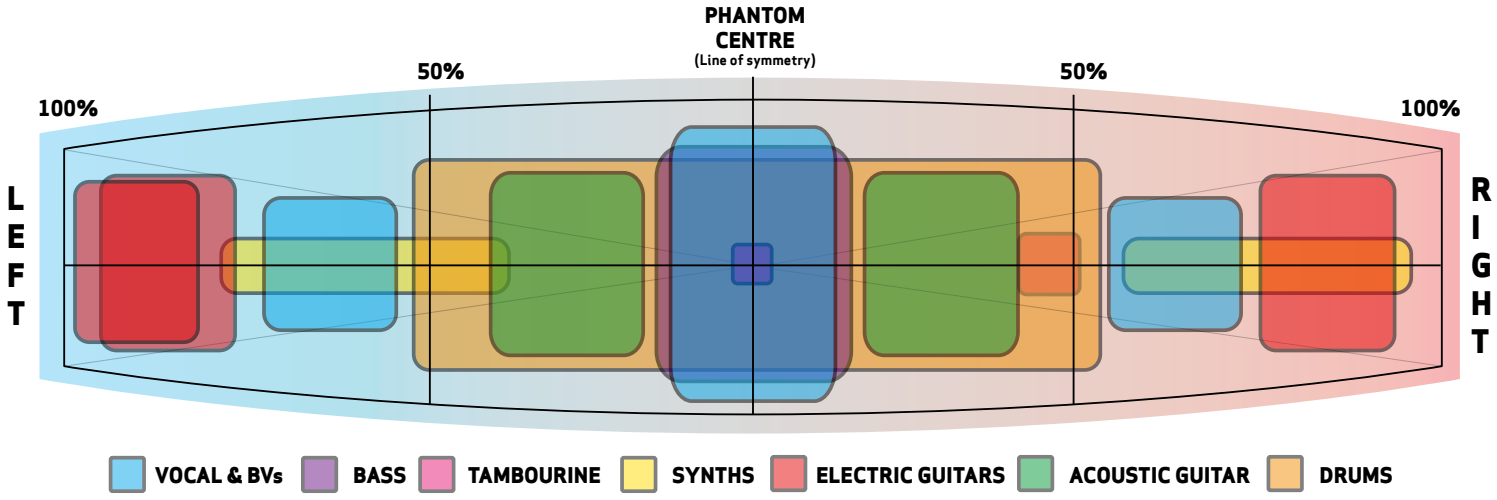
STEREO ELECTRICS

As the mix evolves my mind is constantly addressing the picture in front of me, and the epic nature of the landscape I'm trying to portray. The guitars and vocal are key to this landscape making sense so I hone in further on the stereo electrics. These two instruments are interacting well and are naturally creating some nice movement across the stereo image, but the left one is my favourite; it's big and beautifully played, and has epic qualities written all over it. The two mics on this instrument are an AEA R92 and a Shure SM57 (let's say), and to create the illusion of scale, I change the position of the 57 to about 3pm on the pan pot and turn its level down a fair bit. I also add to this a delay of about 100ms (mixed 100% 'wet' with about 30% feedback) and immediately the scale starts changing. I exaggerate the 57's tonal response, making it slightly boxier and harder, turn it down even further and immediately the guitar has started to sound 'a bit epic' – thanks to the panning, the altered tone (a sound at distance never has the same fidelity as when it's up close) and the delay. But then it dawns on me: my big landscape guitar now sounds too much like it's inside, not outside... the slap echo is too distinct and wall-like, even though it can certainly sound like that in the great outdoors sometimes. Hmmm.

I mumble something to myself like: 'yeah, but who cares, stop being a super-realist you idiot' but change tack anyway. I swap the mics around: the 57 is now 87% left and the R92 ribbon takes over the 57's more distant, right-of-centre role, including taking on its delay settings, which are themselves now sounding duller and rounder. Suddenly my guitar is clearer and harder sounding; too hard in fact, so I ditch



Simple & Clear: Simpler mixes allow the elements within to be bigger and wider. Less instruments means more space: space for improved fidelity, more width for instruments, and increased transparency. In the example above, the vocals can be big and full, the electric guitar can occupy most of the left side and the piano most of the right. Acoustics are mid-panned and everything is free to overlap and sink deep into the background courtesy of panned reverb and delays.



More Sounds = Less Space: In our slightly more complex 'Blue Mountains' mix, the elements within are panned for balance and width, but each instrument and voice is now occupying slightly less real estate. Symmetry remains critical. Things that overlap are placed at varying depths, and reverb and delay help create the illusion of space. Tambourines and synth pads are placed in the background and project forward, while guitars and the main vocal occupy the front grid positions, echoing and decaying into a big, deep and dark background.

the 57's initial EQ setting. I add a big 480L plate reverb, fed by the ribbon mic – panned hard left/right and featuring nothing much above 900Hz. The ribbon mic's rounder tone accentuates the dull yet lengthy nature of the 480L space. To this I dial in a 180ms predelay. I eventually decide to duplicate the ribbon mic channel to help broaden and deepen the 57's tone by tucking this duplicate back in behind the 57, separated in width by about 10%. Bingo, the guitar has become more vivid but also more epic sounding – close yet enormous, thanks to the panning and predelays creating the illusion of something big and vaguely reflective in the middle distance on the right-hand side, and behind that a dull, wide and deep backdrop. There is no 'zing' coming back to the listener from this particular outdoor landscape.

The acoustic gets a smidge of the guitar's 480L, but stays fairly tight in with the main vocal, which has a complex array of compressors, automated EQ and a vocal reverb. The vocal also has two delays on it that are panned 70% left/right – very dull – one of which is made to sound like it's bouncing off the same hilltop as the guitar by also receiving a smidge of the 480L, and suddenly the song comes to life visually. I pan the drum kit but limit its width to a maximum of about 55% left/right on the overheads and toms. It sounds better from the kit's individual perspective to go wider, but it makes no sense visually for it to be this wide in the physical landscape. When it's made to sit back eight yards or so, thanks to a reverb, yet is panned hard left/right, it's suddenly *trying very hard* to be 80 feet wide! I don't want that. By placing the drums inside the guitars, their proportion remains realistic and the environment is made to sound even bigger, not smaller. Sorry drums.

USE YOUR ILLUSION

Finally (and briefly) to our other sounds: the female BVs are made brighter than the main vocal – yes brighter – but smaller, wetter and wider – panned to about 8am and 4pm, along with their reverb. I later just go 'bugger it' and pan their reverb fully left and right. The tambourine is back in the mix, panned centre, and its plug-in insert reverb is about 90% wet with no predelay and panned tight, about 35% left/right. This makes it seem like it's far away. The key to this illusion is understanding that a big predelay would have inferred that the tambourine was closer to us than the mountains behind it – a predelay tends to separate a sound from the environment around it – but we don't want that. We want it to come towards us from a great distance as if it's out there in the landscape. No predelay helps convince us of this 'natural phenomenon' and contributes to the overall illusion of scale.

I won't go into any more detail than that – hopefully you get the picture.

The key to this mix being both interesting and physically 'outdoorsy' sounding is by constantly asking yourself questions like: 'How would the 'Blue Mountains' themselves have reacted to this combination of sounds, where is Signal X originating from, and how should that affect my panning, tone and reverb?' and so on. I'm not suggesting you become a literalist about all this, nor am I inferring that this disciplined visual approach applies to every mix – not at all. I'm simply illustrating the point that understanding how an actual landscape might have responded to the band had they literally been there, helps to provide your mind's eye with a framework in which to work.

MONO E MONO

Above all else, panning helps create space and balance. The real trick is determining how to pan all your different sounds and instruments in such a way that the overall outcome remains symmetrical. One way to do this relates directly to the concept of panning for scale.

Let's say, for example, we're mixing 250 channels of instruments, voices and sound effects – I know, I know, that's a hell of a lot! At the beginning of such a daunting session, it might seem nigh on impossible to ascertain what goes where, particularly when the multitrack file is delivered to you like a 'fur ball', with most things bunched up in the middle (see *The Mind's Eye* box item for more on this). Trying to find 'like pairs' and 'opposites' in this world of confusion is exceedingly difficult.

In this extreme case the most important first principle to grasp is that the mix is going to be *big* – and unless you cut 100 channels out, you're in for a *very* long haul. Secondly, a mix involving this many 'characters' means that, in some form or other, most of them will need to be discrete – i.e. mono (or almost mono). Yes, I know there are precious, masterfully captured stereo recordings of pianos, synths, choirs, guitars, orchestras, and so on in amongst all this, but trust me, if you get hung up on each one's exquisite individuality – as it was recorded – and try and find a big wide space for each of them to occupy, you're going to get very frustrated very quickly… and nowhere fast. All you'll end up with is a big fat mess right in the middle of the image. The main alternative to this is to edit 60 percent of the instruments out of the mix – a viable, and in some cases

THE MIND'S EYE

If you're sitting down at your DAW or console (or both) and preparing yourself for a mix session, in most cases, you'll be starting with a digital multitrack file either of your own making or someone else's. The files will nearly always be a combination of stereo sounds, discrete mono instruments, groups of instruments etc, all in a relatively shambolic state. When you first pull up new session files, you'll often curiously find that they're quite bunched up in the middle, like a giant fur ball. This often indicates several things: that there are lots of mono sources panned centre (pretty obviously because they're not mixed yet), that the stereo pairs feature the source *in the centre*, and that panning is going to play an important role in the mix. Even if there are lots of stereo pairs in the multitrack, these will still most likely sound mono in amongst all this clutter because they will nearly all have been recorded by engineers who have falsely assumed that stereo pairs should always be recorded symmetrically. In reality, it's often preferable that the stereo sound be recorded *asymmetrically* to emphasise the space around it or give it character.

preferable, alternative. (If an artist insists on having 250 sounds in their mix, it's vitally important to make them realise early on that each sound will compromise all the others, and when there are so many, the compromises will be significant.)

Generally stated, big mixes featuring very few instruments can be easily created using wide panning regimes and stereo placement of instruments, delays and reverberation. Big mixes featuring *hundreds* of instruments, meanwhile, mostly require pinpoint mono sources, as well as layers of depth, a fine grasp of width, and overall balance. Discrete sources create natural focus, a vital ingredient when so many sounds are vying for the crowded space. If you're faced with this level of mix complexity, consider the 'mono sources' option. Somewhat counter-intuitively, 200-odd mono sources panned throughout a stereo image will typically sound truly enormous, provided they are also placed at various distances from the listener. Lots of stereo instruments panned left/right, on the other hand, will not.

BALANCE, BALANCE, BALANCE

Panning is also fundamentally about balance. Bright signals panned left require some sort of counterbalance in the right. Things soloing in the right speaker should be overtaken by another instrument soloing in the left, and so on. It's bad panning practice to make a mix sound lopsided for extended periods of time, either by making the tonal balance seem skewed to the left or right – too bright on one side – or by making one side inadvertently louder or more dynamic than the other. Whatever your instruments, and regardless of how many there are, it's vitally important to achieve balance with your panning. If the music draws you in one direction for some reason or another, the balance must naturally be rectified by the next musical movement that comes along. Sure there are exceptions to this dogma, but they are few and far between. A mix that makes someone feel like they have something wrong with one ear, or speaker, is a bad mix. It might seem 'cool' at first, but that impression won't last.

YOU ARE THE PERSPECTIVE

I won't delve into another example now – we're out of room unfortunately. Instead, I want to leave you with one final notion that applies more to physical three-dimensional panning regimes than the more radical ones we'll explore next issue.

When you're creating visual, illusion-based mixes like the one touched on earlier, there's one thing to keep in mind: you, the listener, *are* the perspective. If you're creating a big mix – very three-dimensional, wide and deep sounding – don't push instruments that you want close up, too wide. The reason for this is fairly straightforward yet subjective, but also dependent on how much you want to outright mimic principles that govern the physical world.

If a sound (in an otherwise big, three-dimensional mix) is dry, yet panned 100% left, it feels like it's stepping outside the lines of the stereo image (see illustration). Without *any* signal coming from the right speaker, it no longer feels like it's *in* the space, but rather *separated from it*. If that's what you want to achieve with this particular sound, fine – just be aware of it. The drier the sound, the closer it theoretically seems to be. If it's 100% left, not only will it tend to compromise the scale of our most distant objects, it will also start sounding like its coming from behind you, particularly in headphones (more on that next issue). Not all mix engineers would agree with this, but in general, a dry, full-fidelity sound panned hard will tend to fight against the illusion of our deep, three-dimensionality, since no reverb can exist outside it. It also makes a listener instinctively want to turn towards it, which is impossible, and in headphones, would set you spinning! Avoid going past about 90% if you insist on going 'wide and dry'. Of course, if you simply *want* to confound the overall illusion, go right ahead. Only one rule applies in the end: do you like the sound of it?

Next issue we'll get stuck into some of the ways panning can contribute to movement and depth, how an instrument's pan position might be anticipated at the recording stage, and explore a few of the more 'out there' effects-based techniques. Until then, explore the space (particularly with a cowbell), and always remember, *balance is king*.