Kia ora koutou. This episode is designed to introduce you to three different types of microphones and three different types of non-human sounds you might gather when producing a podcast.

Microphones: there are many different ways of describing differences in types of microphones, but one of the primary ways is by the microphone's directionality, or its polar pattern. Microphones are designed to pick up different sounds in different directions more acutely or less acutely to improve the quality of the sound.

For example, shotgun microphones. Have you been to a movie set? Have you seen someone holding up on a long boom pole with a shock mount at the end a very long and narrow microphone pointed directly at the mouth of the actors in the scene? That is a shotgun microphone. Shotgun microphones pick up sound directly in front of the microphone and reduce the sound that they pick up from the sides of the microphone. They're also a bit sensitive to picking up sound that comes out of the back of the microphone, which is often why shotgun microphones are mounted in what's called a "shock mount" that reduces the "handling noise," the trembling of your fingers as you hold the microphone. So shotgun microphones are really great if you're trying to get a very specific direct sound from one location and trying to reduce all the other surrounding sounds, as in a movie set. That's a shotgun microphone.

Cardioid microphones are a bit broader in the sounds that they pick up. Cardioids pick up sound directly in front of them and also to the sides ,but not behind. So if you're holding a cardio microphone in your hand, it will pick up the sound in front of you and to the left and the right and the top and the bottom, but it reduces the amount of sound that it gathers from directly behind the microphone, in other words where the handle of the microphone is, where your hand is. So this reduces what's called the "handling noise," the trembling of your fingers, the squeakiness maybe of the handle of the microphone. So that is a cardioid polar pattern microphone.

And a third major type of microphone is the omnidirectional microphone. As you can probably guess from the prefix "omni," omnidirectional microphones pick up sound in all directions: front, back, left, right, top, bottom, everywhere around it in a sphere omnidirectional microphones pick up sound.

So these three types of microphones have advantages and disadvantages for specific situations that you might want to gather sound for. So we've already talked about shotgun microphones being excellent for single sources and even sources that you're far away from. So for example if you see a tui (bird) up in a tree, and you really want to get that sound if you happen to have access to a shotgun microphone it'll be really good at picking up the sound of the tui even if it's far away from you and erasing the other outdoor sounds to the left and the right surrounding it.

Cardioids are really effective for on the street interviews, as if you're a news reporter for example: you're in a busy place and you're running around and you don't want all the sound of you holding and shaking the microphone, so a cardioid polar pattern reduces that shaking and that handling noise, and does a good job of picking up not just the person in front of you but maybe if you're interviewing a crowd of people at a sports match for example, it would pick up people on on the left and the right as well. So cardioids are really effective for that kind of on the street interview.

And omnidirectional microphones are actually the microphones that are built in to your smartphone and your computer. So if you pick up a smartphone or computer that may be around you right now, and you were to make a voice recording with that smartphone, it wouldn't matter which direction you point the phone You could point the bottom of the phone towards your mouth; you could point the top of the phone towards your mouth, the side, the back; it shouldn't matter.

What does matter with omnidirectional microphones is the proximity to the sound source. So the further the microphone is away from your mouth, the more it'll start picking up other sounds around the room: omnidirectional. But the closer it is to the sound source your voice, then the better job it will do picking up the sound of your voice. So for example, if you're using a smartphone to gather an interview recording with multiple subjects--it's you and three people sitting around a table--it doesn't matter which direction you point the microphone or your your smartphone at all, it doesn't matter the direction. But it does matter how close that phone or that laptop computer with an omni-directional microphone is to the different people who are speaking, especially because some people speak softer or louder than others. And it will also matter what that phone and computer is sitting on or standing on because it is omnidirectional; it's picking up sound from all directions. So if you have it sitting on a table and the table is vibrating, or you have people shuffling papers on the table or elbows on and off the table, or people writing on the table...all of those vibrational sounds will go through to the smartphone or computer microphone because it is an omnidirectional microphone. Shotgun microphones, on the other hand, are much less susceptible to the need for distance because they're so focused nearly focused on what is directly in front of them--the shotgun microphone--they can pick up sounds from very very far away. But the omnidirectional microphone requires proximity, since it's picking up sound from everywhere.

So you've thought now about the omnidirectional microphone in your smartphone or your laptop computer, for example, or your desktop computer. How many microphones are in a smartphone? Do you know? As it turns out, most Android smartphones have two mics, and most iPhone smartphones have three mics. Why? Why would smartphones need multiple microphones? Well, you may know, and in fact you may use, the voice features of your phone. Do you ever use voice-to-text? Do you ever say, "Hey Siri..." "Hey google..." and activate...[voice of smartphone]"Here's what I found..." [back to Collin as narrator] I just activated my Siri. Oops! So the voice features of smartphones require more than one microphone because they have to detect which sounds are important and which sounds are not. So they need multiple microphones placed on opposite ends of the phone, and these microphones are detecting sound around them. And they have to determine which sounds matter to activate the voice features of the phone, so that they know while you're in the car with your mates, and you need to ask your phone for directions they need to know to pick up your voice not the voice of your mates in the back seat of the car who might also be talking. So they need multiple microphones to figure out the directionality because these are omnidirectional microphones they can't do directionality on their own, you need two of them to sort out the differences of where sounds are coming from and which sounds are more important. I don't want to go too far down that rabbit hole, but it's a very interesting feature of contemporary smartphones. In order to activate the voice features, they have to have multiple microphones to determine the direction of sound sources, so that then they can guess which sound sources are important enough to activate the appropriate voice features.

So that is a brief introduction to three different types of microphones: the shotgun, the cardioid, and the omnidirectional. And remember those are defined by their directionality, or their polar patterns: which directions do they primarily pick up sounds from? and which directions do they reduce sounds from?

Now when you're gathering audio for your podcast, there are three different types of non-human sounds you might want to gather. Obviously, you'll probably gather interviews; you might have your own voice narration that you choose to record. But you will also typically gather non-human sounds. Let's talk about three of those: that's the "room tone," ambient sound, and sound effects.

First a "room tone." Close your eyes and listen: What do you hear? That's the sound of my room. When it's totally quiet, it's not actually totally quiet. You might also choose to pause this recording and close your eyes and listen quietly in whatever space you're in. You may not be in a very quiet space. You could be in a public space, or you could be driving. But if you are in a quiet space, listen to the sounds in your space. Silence is almost never silence, unless you're in outer space. Every room has a sound. Every exterior has a sound, especially in New Zealand with all of our wonderful birds. But every interior room has a specific sound, and that sound is called a "room tone." Now it's dictated by the size of the room: How high are the ceilings? How big or small is the room? Is it just a bedroom? Or is it a big conference room? What kinds of windows does it have: single or double glazing? Does it have windows at all? Is there a heater on? If so what kind of heater? Does it rattle? Does it can you hear the air being pumped in? Are there a bunch of computers on in the room, and they're running fans that operate and create a kind of sound?

So every room has a sound. And whenever you go to a room to, for example, do an interview, the first or last thing that you should do--either before or after conducting the interview--is get a room tone. That means gather one to two minutes of just silence in the room. Don't forget the room tone. It's super important. But why? Why would you want 60 to 90 seconds, maybe 120 seconds, of silence? The answer is that when you're putting together the audio for your podcast episode later, and you're piecing together the different speakers, sometimes you need pauses to mark transitions or to give space between the different speakers voices to establish a rhythm for your podcast. And if you have a gap, even a gap of half a second, where there's no sound at all, you notice the difference. Because there's a difference between zero sound--the absence of sound--and a quiet room, because a quiet room actually has a sound. So every time you go gather an interview, whatever room you're in, gather 60 to 120 seconds of room tone, so that you can layer that underneath all of your interview, so that there is not an abrupt even a half a second gap of zero sound because I guarantee you would notice zero sound. Because the absence of sound is very different than the quietness of a room, and its room tone.

The second type of sound you might want to gather is ambient sound. So for example, if you're doing a story on a particular topic, you might want to get to the sound of a hustling, bustling street. Or maybe the sound of a bus stop. Or the sound of a sports match or a pub. These are kinds of ambient sounds that give character and set the scene for your listeners of where you are and what kind of place that you're in so they can be transported into the narrative that you're trying to tell. So think carefully, identify early in your podcast design, what kinds of ambient sounds could really augment the story that you're trying to tell? Make a list of those, and then go out and gather those sounds.

Now, this is where you'll have to think carefully about how to get those sounds. Let's use the example of the pub: Which kind of microphone might be best for gathering ambient sound of general pub noise? A shotgun microphone, a cardioid microphone, or an omnidirectional microphone? What advantages and disadvantages would those microphones have, if you had access to all three? The shotgun would be really great if you wanted to hear one specific conversation in a pub. But it's not going to be very good for gathering overall boisterous pub atmosphere, with music going and glasses clinking and people shouting. It would pick up very specific voices. So shotgun microphone is probably not what you want. Cardioid could work, but it depends on which direction you point your cardioid microphone. Because remember it picks up the sound in front and to the sides, but not to the back. So a cardio microphone could work. Omnidirectional: if you were to take your smartphone into the pub to record some noise, that could work too. But remember it's omnidirectional, so it's recording even the sound of your hand holding the microphone, or wherever you choose to set the microphone, if you choose to set your smartphone on, say, a bar table, a bar stool, or prop it up on your beer glass perhaps. So be very aware that your omnidirectional microphone would be good for picking up sound in all directions, but be very careful about the handling noise that may come with using that.

So what I recommend, after identifying what microphones you have access to and are best for the situation, going to your location like the pub and doing several tests before recording your official kind of background music. The best way to do this is to pick a spot, record for a few seconds, then listen to it with headphones on. You have to use headphones. If you have over-ear headphones that would be the best. If not, Bluetooth headphones, whatever other kinds of headphones you have could work. But you're not going to be able to hear all of the sounds very well if you just try to listen to it through your little speakers in your smartphone. So get a demo recording, pop on your headphones, replay the demo back. Listen carefully to what it sounds like: What sounds are dominant? Which sounds are quiet? And what sounds are you really after? Then go to a different place in the pub, or maybe reposition the phone on top of something else to reduce the handling noise, and record again. See how that works. Pause it, listen to it again with headphones. Listen very carefully for the handling noise, the noises that you don't want, and listen for the noises that you are trying to capture, and reposition again. And go back and forth until you find just the right position that really captures the sound that you're after. And then establish your ambient sound recording of the pub.

The third and final type of sounds you might want to gather are sound effects. So these are the specific sounds that could really add character to your narrative. Maybe it's the specific sounds of two people clinking a glass together. Or maybe the sound of a door creaking open, and the winter wind rushing in. Maybe the bartender washing her hands. Or the chef hollering at the another chef in the pub to hurry up with the chips. These are specific sounds that you might want to gather.

So which of those three types of microphones would be good in this situation? A shotgun microphone? A cardioid? Omnidirectional? If you have access to multiple types of microphones, shotguns are really effective in this situation. You can hone in right on the squeaky hinge of that door and get it just creaking open. You know you can get footsteps by pointing the shotgun microphone right at those squeaky boots or those high heels that someone's wearing. Cardioid microphones also work well here. Again they reduce the handling noise of your hand, and you can point the microphone near the sound. But it will pick up sounds to the left and the right of it as well, so it'll have a kind of a mix of ambient sound and the specific creaky noise. You'll want to get that cardioid microphone in real close to the sound source, so that it gets mostly the creaking door or the footsteps and less of the ambient noise to the sides of it. Same thing with omnidirectional microphones: if the only thing you have access to is a smartphone, no problem. But get that smartphone really close to the sound source because it's picking up sound from all directions, so you have to move it in right next to the clinking of the glasses or to the creaky door or the footsteps. I mean, right on the heel of the person who's walking...very, very close.

So that's sound effects. I recommend making a list of sound effects you might want for your story, and then taking your microphone--your smartphone, whatever device you have access to--and going out and playing around with it, seeing what kinds of sounds you can make. You can make all kinds of sounds just by finding a mate and walking up and down a hallway. There's so many different sounds that you can create and use different ways of walking and stepping and stomping and pausing. So have fun. Play with the sound effects.

So to sum up: three different types of microphones: the shotgun, the cardoid, the omnidirectional--determined by their different polar patterns. And three different types of non-human sounds you should consider getting for your podcast: a room tone, wherever you conduct interviews; ambient sound, to add setting to your narrative; and sound effects, to give real character and action to the story that you're creating. Alright, go out, gather some sounds, have fun, and I look forward to hearing what you come up with. Thanks for listening. Kia ora.