

Microphone Practice on Selected Songs from Bon Iver's *For Emma, Forever Ago*

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Abstract: "Record making is a recent art form," writes Albin Zak (2001: 26), "and many of its artistic roles belong to no prior tradition—we know what songwriters do, but what about sound engineers?" This paper attempts to answer Zak's question, if only in part. Specifically it addresses microphone practice and the role it plays in the creation of records. The analytic model used in Towards a Model for Analyzing Microphone Practice on Rock Recordings (Lewis, 2010), provides a structure with which to outline and analyze a case study of the microphone techniques on Bon Iver's 2007 album, For Emma, Forever Ago.

Microphone practice is instrumental in creating the characteristic sound of a track. Though every step in the tracking and mixing process influences the resulting sound of a recording, the audible consequences of microphone practice are some of the most easily audible characteristics of a completed track. This is especially true for forms of music that eschew "conspicuous" signal processing techniques in favour of more veridic production values.¹ There are several distinct aspects of microphone practice that I will examine individually in order to best elucidate the audible consequences of each. However, all of the examined aspects of microphone practice are heard by a listener at once while auditioning a track, and so these aspects work together in tandem to create part of that track's sonic character. Because of this, no one aspect of microphone practice—that is, microphone choice, proximity, placement or angling—can truly be considered separate from the others.

Bon Iver's breakthrough album, *For Emma, Forever Ago* (2007), provides an invaluable "case study" for the model of analysis outlined in my Master's thesis, "Towards a Model for Analyzing Microphone Practice on Rock Recordings" (Lewis 2010).² This album has been lauded by critics, musicians and re-

cordists alike, as a triumph of the emerging “project” aesthetic in recording practice. In fact, the vast majority of attention which *For Emma* has received from critics in the past three years has been largely focused on the notoriously ascetic “project” environment which Justin Vernon constructed to track the album. Specifically, Vernon tracked *For Emma* in a hunting cabin deep in the woods of Wisconsin (Captain 2007). He recorded all but a few of the vocal and horn tracks which appear on *For Emma* using only a single Shure SM57 dynamic (moving coil) microphone, a Pro-Tools “Mbox” digital-audio interface, and a laptop computer loaded with the Pro Tools “Mpowered” DAW that comes bundled with the purchase of every new “Mbox” interface (ibid). Though all of his tracking choices ultimately influence *For Emma*’s overall sonic character, Vernon’s unconventional use of a single dynamic microphone to transduce all of his vocal and acoustic guitar tracks is of particular importance.

Vernon’s microphone choice on *For Emma* is unconventional because it is highly unusual for recordists to track an entire album with a single microphone. On the contrary, it is much more usual for a wide variety of microphones to be utilized, each with its own response characteristics, preferred usage and “operations principle.” The operations principle of a microphone determines the way it transduces sound. There are three main operations principles used in modern recording studios: dynamic (moving coil), ribbon, and condenser (capacitor).³

A condenser microphone contains a capsule consisting of two thin plates, one fixed and one unfixed, which comprise a capacitor—the term “condenser” is actually an outdated term for a capacitor (Izhaki 2008:119). In a very simplified manner of speaking, a capacitor consists of two plates, one fixed and the other unfixed. The unfixed plate sits at the front of the capsule and acts as the microphone’s diaphragm. As the front plate is disturbed by soundwaves, it vibrates sympathetically, inducing a charge between itself and the unfixed plate. Because the front plate of the capsule is relatively light and moves easily, condenser microphones offer an accurate, nearly uncoloured transduction of a soundwave. For similar reasons, the condenser microphone also boasts a wide frequency response compared to the other types of microphones. These characteristics have led the condenser microphone to become the conventional microphone choice for both acoustic guitars and vocal tracks.⁴

In this sense, Justin Vernon’s decision to use a Shure SM57 to transduce the majority of the tracks on *For Emma* is unconventional, even outside of the narrowed scope of microphone choice. The Shure SM57 is a dynamic (moving coil) microphone, which has a distinctly rugged operations principle. It consists of a magnetic core, with many turns of wire wrapped around it. These turns of wire are referred to as the “voice coil” of the microphone, which is

connected at the front of the microphone to a diaphragm. When a soundwave disturbs a dynamic microphone's diaphragm, the microphone's voice coil moves in sympathetic vibration with the soundwave. The voice coil of a dynamic microphone, however, is much more heavy and rigid than the front plate of the condenser microphone's capsule. This means that the dynamic microphone has a much more limited frequency response and, because of this, provides a much less transparent transduction of soundwaves.

The use of the Shure SM57 is obvious on *For Emma*. Vernon's vocal tracks are particularly dark and muddy, especially when compared to those transduced for the song "Woods" on his later EP, *Blood Bank* (2009). All of the vocal tracks, without exception, are muddier than the lead vocal tracks on "Woods." To be more specific, there is more upper mid and high frequency content on the vocal tracks from the later song than on any of the tracks from *For Emma*. Surely the spectral content on "Woods" is further complicated by Vernon's extensive use of pitch shifting, but even through this heavy signal processing a listener can hear delicate aspects of the vocal performance that are less audible on the 2007 album. In particular, during the opening moments of "Woods" the sibilance of Vernon's performance and the "pops" of air from his plosive consonants are exceptionally present. Though these parts of his performance are also audible on, say, "Blindsided," the hisses and pops are more abrupt in their envelope, and lack the nuance of the transduction of "Woods."⁵

Clearly this proves that microphone choice has, at the very least, some bearing on the final character of a recording. However, proximity and placement also influence this character and, as earlier stated, it is inadvisable to examine one aspect of microphone practice in a vacuum from the others. The remainder of this paper will consist of a case study of the songs "Skinny Love," "Creature Fear" and "For Emma" from Bon Iver's *For Emma* (2007).⁶ The detailed examination of these tracks will support claims that microphone practice can be read as a primarily musical concern and that the aspects of microphone practice cannot be considered independently from one another.⁷

Case Study: "Skinny Love"

"Skinny Love" boasts clearer, and more present, guitar tracks than most other songs on *For Emma*. Upon a first listen, there seems to be a slapback echo on the guitar tracks, but as the song continues, it becomes apparent that there are simply two guitar tracks playing in unison.⁸ At 0:10, the guitar tracks split—panned hard left and hard right, respectively—and the different microphone techniques used to capture both become clear. One track is quite

warm—very obviously the result of a microphone positioned at the sound hole. This instrument supplies the song’s bass line, which has a slightly different rhythm than the second guitar part. It seems likely that Vernon used the baritone guitar to perform this part, given its generally dark character. String noise is noticeably absent from this track, which indicates that the microphone was placed at the sound hole and pointed away from the neck.

The second guitar on “Skinny Love” is slightly detuned, and the open strings function as a drone.⁹ Buzzing and string noise are prominent on this track, and when Vernon allows the open strings to resonate freely, reverberation becomes audible. The microphone on this track is distant from the neck of the guitar. The lack of low-frequency content in the drone notes also suggest that there is some distance between the microphone and the neck of the guitar, and that the microphone is pointed slightly off-axis from the sound hole, from its position at the twelfth fret.¹⁰

More interestingly, “Skinny Love” breaks from the percussive trends established in the first two tracks on *For Emma*. Rather than simple kick and snare, Vernon elects to include several tracks of hand claps. The first of these tracks enters at 3:05, but the precise timing is difficult to pinpoint because the rhythm, at first, is the same as the snare, and both tracks mask each other in the mix. The hand claps only become obvious in the mix after 3:20. The texture of the song thins at this point, and the hand claps both change their rhythm and become less precise in their attack. The quality of the individual hand clap tracks is brought to the listener’s attention as the attacks become more staggered and exaggerated. The microphone does not peak when the claps occur, and there is a great deal of room reverberation on these tracks. Obviously, Vernon transduced the claps at a distance from the microphone, probably of several feet. It is also likely that Vernon recorded the hand claps from several angles of incidence to the microphone, in order to get several different tones, giving the impression of a group of people clapping rather than just one person clapping very loudly.

The vocal tracks on “Skinny Love” present an excellent example of comb-filtering. “Skinny Love” features only a single melody, which Vernon doubles throughout the song.¹¹ The misalignment of the consonants from both vocal tracks suggests that they are separate takes. When Vernon sings in his chest voice, both tracks sound completely in-phase, and the overall loudness of the track increases evenly across the frequency spectrum, such as on the line “*my my my, my my my my my*” at the end of the first verse. Most other lines are sung in Vernon’s trademark falsetto. In these sections, certain frequencies seem to be louder than others, and the combined tone of the two tracks becomes distorted.

On the line “*come on skinny love, just last the year, pour a little salt, we were never here,*” a distinct proximity discrepancy can be heard between the two vocal tracks, one of which is panned slightly to the left, and the other slightly to the right. The vocal track panned more to the left of the sonic sound-stage is both more present, and darker, than the other. This track is also further forward in the mix than the other, and serves as the lead vocal track. It seems to have been transduced with the Shure SM57 at a fairly close proximity to Vernon’s mouth, and directly on-axis. The lack of “pops”—that is, bursts of air that overload the circuitry of the microphone at the incident of plosive alveolar and fricative consonants—indicates that Vernon very likely used a pop screen and was careful not to sing directly into the microphone’s diaphragm during moments of elevated intensity. Or it could indicate that the proximate nature of the track was actually achieved through equalization. The second vocal track on “Skinny Love,” panned slightly right, plays a supportive role in the texture of the song. In the first line of the song, the distance between the SM57 and Vernon’s mouth on this track is clearly audible. The tone of the voice on the right side of the sound-stage is thinner than the voice on the left. Vernon seems to intentionally use a weaker vocal tone, with more audible breath leaking past his vocal folds, but there is less evidence of the proximity effect on this track than on the other.¹²

Case Study: “Creature Fear”

“Creature Fear” is a study in microphone proximity. Rather than the slick blend of proximal tones found in professional recordings and the project recordings that emulate them, Vernon’s production on this song allows the proximity between the SM57 and the given sound sources to be particularly apparent. All parts of the verses are quite clearly transduced with distance between the sound source and the microphone. The two vocal tracks, though not captured by an extremely distant microphone, are even thinner than the vocals found on the other tracks on *For Emma*. The room reverberations seem to cause phasing issues between the two tracks at 1:35, on the line “*I was teased by your blouse.*” This piercing rumble is even more pronounced on the word “*lowered*” several seconds later at 1:49. The angle of incidence of the vocal tracks to the microphone must have differed to have this amount of disagreement in the overtones of the same voice. Vernon’s position in the recording space more than likely changed as well when he tracked the two vocal parts, changing the number of reflections and the pre-delay times for the two vocal takes.

The guitar playing is remarkably quiet and lacks presence during the

verses. Rather than strumming the bare chords, Vernon picks a note or two at a time, and the rattling of the strings is, again, audible. The most notable difference between this guitar track and others on *For Emma* is the thin tone of the plucked low E-string. On other songs, like the track “Blindsided,” the low notes of the guitar are more prominent in the mix. In the verses of “Creature Fear,” they are not any more noticeable than the other notes played on the higher-pitched strings of the guitar. Obviously the microphone must have been positioned further from the sound-hole than it had been earlier on the album. However, the distinct lack of string noise means that the microphone could not have been placed towards the neck. Rather, it was likely pointed up at the face of the guitar, eight inches or more below the strings, somewhere between the twelfth fret and the sound-hole.

The chorus of the song, in contrast with the verses, is full and present. Vernon’s thin, breathy falsetto immediately becomes thicker when “Creature Fear” transitions to the B section. There is even less accentuation of the more piercing frequencies as the two falsetto tracks run simultaneously. Vernon is much closer to the microphone here, and rather than perform at various angles to the microphone, he simply positions his mouth on-axis. The sibilant consonants on the track are also much more pronounced than in the verse. The ‘s’ in “*lost*” in the first verse lacks the audible high-frequency content of air being pushed past the teeth that characterizes the first ‘s’ of the chorus: “*so many foreign worlds...*” The ‘s’ of “*say you are the only one,*” the line that leads into the chorus, is slightly more accentuated than the same consonant in the earlier utterance of the word “*lost,*” but it is not as exaggerated as the ‘s’ at the beginning of the chorus. This implies that Vernon leaned into the microphone, anticipating the increased energy, SPLs and, especially, proximity his vocals require in the chorus.

The bass frequencies of the guitar become markedly more prominent when the song moves into the chorus. Rather than being thin and difficult to hear, the low E-string of the guitar rushes to the fore of the mix. I would suggest that the method of transduction changes in this moment, since microphone transduction of an acoustic guitar could never produce such a preternatural sonic image without producing distortion. It seems likely that when Vernon transitions to the chorus, the bass line is recorded direct.¹³ The detail in the bass line supports this, as there are a few turns in the final repetition of the chorus where every note is individually audible. There is distortion on both the bass line and on the second, strummed, guitar in the final repetition of the chorus, adding to the full texture and loudness that provides an exaggerated contrast to the verses.

Case Study: “For Emma”

In the song “For Emma” there are, as always on the album, two separate acoustic guitar tracks. In this case, unlike many of the other tracks on *For Emma*, there is no distinct difference in the microphone practice used to transduce each guitar. Simply panned hard left and right, the tracks are both relatively dark and lack any string noise or rattling whatsoever. Vernon obviously placed the Shure SM57 halfway between the sound-hole of his guitar and the fret board, and then angled the microphone so that it would reject any noises coming from the neck of the guitar. This is the closest Vernon comes to capturing his acoustic guitar in a conventionally commercial manner, and the resulting sonic image is the most clear and precise of any acoustic guitar track on the album. The sound of the pick scraping against the strings is audible on both tracks, and is the only indicator that they are not one and the same track, or a doubled track panned hard left and right. When one track has Vernon miss a number of strings while strumming, the balance of the mix is disrupted, and the listener is immediately made aware that the two tracks are not a product of manual doubling.

The kick-drum rhythm is the same as the acoustic guitar and it seems to exist in the mix only to reinforce the pick attack transients of the strumming. Less of the character of the drum skin is audible on this track, indicating a very close proximity between microphone and drum head. It seems likely that the microphone may have been placed within an inch of the skin, since the resonance of the drum itself is what seems to colour the sound. There is also no slapping sound of the beater on the skin, indicating that the Shure SM57 was probably on the side of the drum head furthest from the beater.

The vocals, like the acoustic guitar, are fairly dark. Despite the fact that Vernon sings in falsetto, and despite the fact that he adopts a breathy tone, his multiple vocal tracks are never as emphatic as those on “Skinny Love,” for instance. Close proximity would explain the warmth and presence of the softly sung passages, but it would not explain how the high frequencies of the falsetto singing do not sum in an additive manner when the vocal tracks are played back at the same time. I believe the breathiness that exists on sustained notes, like the note Vernon sings on the line “*to bring, a, to string along,*” is the key to understanding the microphone placement used in this instance. The Shure SM57 could have been very close to Justin Vernon’s mouth, within an inch, which would allow him to take advantage of the proximity effect, regardless of the microphone’s bass roll-off. Rather than use a pop screen, however, the microphone could have been positioned slightly above the mouth, out of the way of the puffs of air that shoot directly out of a singer’s mouth to cause

“popping.” Moreover, any air that leaked out of Vernon’s nose while he held a sustained tone would expel directly at the diaphragm of the microphone, which could, in turn, cause the breathy hiss that occurs several times over the course of the song.

The horns heard on “For Emma” present a particular analytic challenge. Justin Vernon does not play trumpet or trombone on *For Emma*: the tracks were overdubbed long after the initial tracking concluded. I am aware of no concrete sources, in the form of interviews or otherwise, that support any claims about the capturing of the spectral images of these wind instrument parts. One might assume that because the rest of the album was recorded with a single microphone, Vernon would use that microphone to transduce the horns as well, for consistency’s sake. However, the vibrancy of the tone on the horn tracks is inconsistent with all the other tracks on the album, save those that appear to have been recorded direct, and rock mixes feature multiple ambiences as a rule. In the thick texture of “For Emma,” real room reverberations are easy to hide, especially amongst the wash of low-frequencies produced by the kick-drum and acoustic guitar. I believe that the trumpet and trombone were, in fact, transduced with a large-diaphragm condenser microphone, but from a distance of perhaps one to three feet: both tracks lack the presence that would indicate a closer microphone placement.

Location and situation seem to have allowed Justin Vernon to craft the dark, muddy and moody sonic character of *For Emma* in a manner that is contrary to the methods usually extolled in recording culture, both in institutionalized pedagogy and in less formal discussions between trained and untrained recordists. While convention states that recordists should use a large-diaphragm condenser microphone to transduce lead vocals and acoustic guitars, it only holds true if the final desired sound is one that benefits from a transparent transduction. Recording in a cabin in the woods, removed from access to a large cabinet of microphones and the advice of his peers, Vernon tracked his solo project with an inadvisable microphone in an inadvisable setting (a space untreated for sound).

However, his choices did not damage his final product and Vernon walked away from his experimental recording project with a product that was largely praised. This seems to prove a statement made by Jay Hodgson that “microphone selection is an extremely personalized technique...despite the proscriptions of audio-engineering textbooks there is no single correct way to select, let alone use, a microphone” (2010:14). I would suggest that not only was Vernon working against audio-engineering textbooks, but also social pressure from his peers in recording culture to use the clearest, most transparent, and ultimately most expensive microphones available, regardless of the sonic

goals of the project.¹⁴ The muffled sonic character of *For Emma* would have been drastically different had the usual wisdom about choosing microphones been applied.

Clearly, the aspects of microphone practice are inextricable from one another. Microphone choice, placement and positioning (or angling) each have their own audible consequences and influence the audible consequences of the other aspects. The guitar tone on “Skinny Love” is not simply a product of microphone proximity, the vocal tracks are not simply a product of microphone choice. Moreover, when these facets are considered in tandem, it becomes obvious that they all contribute a great deal to the sonic character of any recording. This is obviously audible on “Skinny Love,” “Creature Fear,” and “For Emma,” but it is true for almost any song with veridic production values. It is precisely in the universality of these audible consequences, and the complexity with which they present themselves within a given recording, that clear analytic value can be found. 🌿

Notes

1. Signal processing techniques that are considered “particularly conspicuous” in this context include pitch-shifting, explicit auto-tuning, such as that used on the Bon Iver track “Woods” (which is similar to pitch shifting), phase-shifting and excessive use of synthetic reverberation. Such techniques are considered to be “particularly conspicuous” because they are obvious to the untrained ear, and can mask the audible consequences of various other steps in the tracking process.

2. I will refer to *For Emma, Forever Ago* as *For Emma* for the remainder of this paper.

3. The ribbon microphone is more rarely used than either the dynamic or condenser microphone, and is not pertinent to the analysis of *For Emma*. Because of this, and due to the brevity of this paper, I will not spend time explaining the ribbon microphone’s operations principle. For more information on this topic, one can refer to a number of sources, including *The Microphone Book* (Eargle 2004), *Modern Recording Techniques* (Huber 2009), *The Audio Dictionary* (Louie and White 2005) or the recent Master’s thesis, *Towards a Model for Analyzing Microphone Practice on Rock Recordings* (Lewis 2010).

4. Books on recording practice and practical recording texts that note the preference for large diaphragm condenser microphones when transducing lead vocals and acoustic guitar tracks include *Understanding Records: A Field Guide to Recording Practice* by Jay Hodgson (2010), *Modern Recording Techniques* by David Huber (2010), *In the Studio with Michael Jackson* by Bruce Swedien (2009) and *Understanding Audio* by Daniel M. Thompson (2005). Less formal discussions on the topic of microphone

choice between recordists can be found in the forum “So Much Gear, So Little Time” at <http://www.gearsutz.com> (Accessed January, 2011). It should be noted that though Hodgson does state that recordists “use large-diaphragm condenser microphones to transduce sound sources comprised of an obviously expansive array of frequencies like lead vocals, classical guitars, drum [overheads] and reverberations” (2010:20), he emphasizes that this is simply conventional use and not a rule.

5. It is worth noting that other tracks on *Blood Bank*, most particularly the title track, do share the dark, muffled vocal tone of *For Emma*. It was unclear, at time of submission, whether or not this is due to similar microphone choices.

6. Obviously the scope of this paper does not allow for an analysis of the full album. I have chosen this tracks both for its status as a *de facto* single on the indie release, and for its relatively wide and varied applications of microphone practice.

7. It may be useful to consult both “Chapter Two: Microphones, Transduction and Acoustics” and “Chapter Three: Constructing the Model” from *Towards a Model for Analyzing Microphone Practice in Rock Recordings* (Lewis 2010) before continuing on to read this brief case study. Though I clarify concepts as best I can in my analysis, they are better explained in this previous work.

8. Slapback echo is a type of special processing first popularized by Chess and Sun Records in the 1950’s. “That is, a single, rapid repeat of the source sound, spaced with sufficient delay time to make the repeat clearly audible, but near enough in time to source to provide a rhythmic effect.” (Doyle 2005:235) Further information on slapback can be found in *The Audio Dictionary* (Louie and White 2003).

9. In this case, I consider a drone to be a static tone that plays through extended sections of a given piece of music. In my analysis I am referring to the highest pitched two strings of Vernon’s guitar.

10. Off-axis refers to the positioning of the microphone in front of the sound source. A microphone that is “on-axis” points directly at the source, while an “off-axis” microphone is pointed askew. The significance of this difference is due to the “polarity” of any given microphone. While some microphones, called omnidirectional microphones, pick up sounds from all directions equally, others, known as unidirectional microphones, have specific directionality in their pickup pattern. Such microphones will transduce the same sound source differently, depending on their angle of incidence or the angle at which they are offset from the source.

11. Comb-filtering is a phenomenon that can occur when two signals are summed. If the signals are out of phase with one another, discrepancies in their amplitude and/or frequency can cause certain frequencies to be cancelled out of the summed signal. Sometimes this can occur and whole spectral bands can be lost, seriously degrading the transparency of the transduction.

12. The proximity effect is a phenomenon that is observable exclusively in directional microphones. It is caused by an increase in a microphone’s sensitivity to bass frequencies when positioned near a sound source. This distance varies from source to source, depending on the SPLs emitted from the source. Generally the

proximity effect can be observed in vocal tracks miked within two inches of the singer's mouth, but it can still colour the sound of louder instruments from a distance of up to two feet (Lewis 2010:39).

13. Recording direct is a method of recording where, rather than miking an instrument or amp, recordists will plug an instrument into a Direct Injection (or DI) box. The result is sonic presence that is not readily achievable when transducing via microphone.

14. Condenser microphones are universally more expensive than moving coil dynamic microphones of the same calibre. Further discussion about microphone choice can be found at: <http://www.gearslutz.com/board/so-much-gear-so-little-time/663229-why-so-many-microphones.html>.

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