Amy Beach Among the Ornithologists[1]

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In 1921, American composer Amy Beach (1867–1944) spent the first of her many summers at the MacDowell Colony, an artists' retreat in Peterborough, New Hampshire. The trip reinvigorated Beach, launching the extremely productive period that capped off her long compositional career. For the next two decades, Beach sketched many new works over the summer in the woods of southern New Hampshire, often finishing them throughout the year, back home in either Cape Cod or New York City.[2] Many of the pieces she began at MacDowell were concerned with natural subjects, from snow and moonlight to flowers and birdsong. Two of the pieces she wrote during that first summer retreat would become well-known piano works: "Hermit Thrush at Eve," and "Hermit Thrush at Morn" (Op. 92, No. 1 & 2) both of which feature Beach's transcriptions of the eponymous bird's distinctive song. Perhaps Beach's most poignant description of the compositional process behind these two pieces came in a 1941 letter soliciting aid to rebuild the MacDowell colony after it sustained heavy damage in the Great New England Hurricane of 1938:

> [A hermit thrush] once lived near a studio at the MacDowell Colony in Peterborough, New Hampshire where I was trying to compose music, only to be constantly interrupted by his beautiful cascades of song.
> Finally I decided to use his incomparable notes in as close an approximation as I could find on a piano. The result was two pieces which people have apparently found suggestive of the bird, recognizing his lonely but appealing tune.

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[1] This is a slightly longer version of the typescript for my AMS 2021 talk—several sentences and examples were edited for time when recording. I delivered a more harmony-oriented presentation on "Hermit Thrush at Morn" at the conference *American Women Pianist-Composers: A Celebration of Amy Beach and Teresa Careño*, held at the University of New Hampshire in September 2017. That typescript, and further materials on this project, can be found at williamohara.net/blog.

[2] See Adrienne Fried Block, *Amy Beach: Passionate Victorian* (New York: Oxford University Press, 1998), 223–224.

> If everyone who remembers with any degree of pleasure my efforts as private secretary to the bird companion would send even a very small sum of money, that lonely workshop will again be able to welcome composers and birds alike.[3]

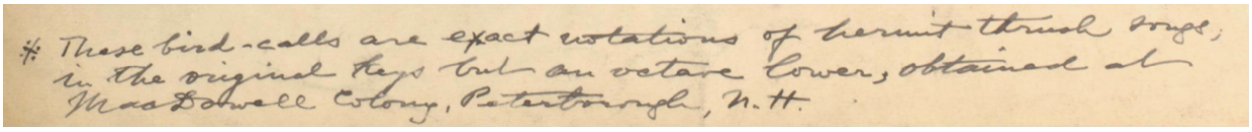
In my talk today, I would like to explore how Beach uses birdsong in these two works, and to place that use of birdsong in the context of Beach's lifelong interest in birds, and in the context of the rapidly evolving transcription practices that were being used by bird enthusiasts of the time, whether professional or amateur. Beach is neither the first musician to take an interest in transcribing birdsong (take, for example, the fanciful "speech bubbles" in Athanasius Kircher's *Musugria Universalis* [1650]), nor the last (30 years later, Messiaen began his famous explorations of birdsong, culminating in 1958's *Catalogue d'oiseaux*). Finally, I'll assess what we can extrapolate about Beach's transcription practices from contemporary research on hermit thrush songs.

Birdsong in the "Hermit Thrush" Pieces

Let's begin by listening to the song of an actual hermit thrush.

[EXAMPLE: HERMIT THRUSH SONG]

Figure 1: Inscription on the manuscript of Amy Beach, "Hermit Thrush at Eve" (Op. 92, No. 1; 1922). Arthur P. Schmidt Company Archives, Music Division, Library of Congress.



As shown in Figure 1, Beach proudly notes the pitch-perfect accuracy of her transcriptions on the first pages of the autograph scores for both of the two pieces. Both pieces draw upon overlapping libraries of transcribed birdsong fragments (which appear in the digital handout

[3] Amy Beach, letter to the editor of the *Musical Courier*, March 13, 1941; quoted in Walter S. Jenkins, *The Remarkable Mrs. Beach, American Composer: A Biographical Account Based on Her Diaries, Letters, Newspaper Clippings, and Personal Remembrances* (Michigan: Harmonie Park Press, 1994), 153–154. On Beach, the MacDowell Colony, and this appeal to charity, see also Block, *Amy Beach: Passionate Victorian*, 286–287; on her later discussions of the work see p. 251. For more on the storm itself and its consequences for the region, see Stephen Long, *Thirty-Eight: The Hurricane that Transformed New England* (New Haven: Yale University Press, 2016).

for this paper). However, they treat those songs in very different ways. The lush and Romantic "Hermit Thrush at Eve" confines its citations of the thrush's song primarily to a single section, a central interlude bracketed by two extended circle-of-fifths sequences. They also reappear briefly at the end of the work. In this guise, the birdsong transcriptions appear almost as the beautiful, cascading interruptions that Beach described in her letter, briefly suspending a work that might otherwise sound like a typical Romantic piano solo. In her autographs, Beach sets these birdsong quotations apart visually, by writing them in smaller notes (this might be partly by necessity as well, due to the density of notes). Printed editions of the works generally preserve this convention.

Let's listen now to an excerpt from the middle section of "Hermit Thrush at Eve," about two minutes in. You'll be able to hear just how closely Beach was able to approximate what she called the bird's "lonely but appealing tune."

[PLAY EXAMPLE: HERMIT THRUSH AT EVE EXCERPT]

"Hermit Thrush at Morn," the second piece in the set, takes a different approach, casting the birdsong front and center. The piece's primary theme is actually derived from two of the bird's calls (fragments F and D in the Appendix); these quotations thus permeate the entire work, and they are often presented in full-sized notation. Perhaps because of this, Hermit Thrush at Morn has received a bit more scholarly attention, such as the analysis offered by Denise Von Glahn in *Music and the Skillful* Listener, which interprets it as an especially close marriage of natural observation and musical expression. Along with this melodic use of the birdsong, "Morn" includes some of the same birdsong excerpts presented in "Eve," again used in a way that seems momentarily to pause the progression of musical time, and printed in small type.

Beach and Birdsong

Amy Beach had a lifelong interest in birdsong, so her transcriptions in the "Hermit Thrush" pieces have a long lineage. At age 10 or 11 (so, about 1878), Beach visited family in California; while there, the poet and UC Berkeley literature professor Edward Rowland Sill learned that she had perfect pitch. He recruited her to transcribe birdsongs for a textbook that a colleague of his was writing—a colleague unfortunately not named in any accounts of this event. Beach related that anecdote in a 1911 article in the women's magazine *The Designer*.[4] In that article, she provided transcriptions and commentary for the songs of several birds, interspersed with stories about her life and her music. And throughout her career, Beach wrote several songs on

[4] See "Bird Songs, Noted in the Woods and Fields by Mrs. H.H.A. Beach for this Article," *The Designer* 34/1 (1911): 7.

avian topics, including a setting of a poem by E.R. Sill, the California naturalist she had met as a child, whose poem "The Thrush" became Beach's Op. 14 in 1891.[5]

Denise Von Glahn situates Beach and several other American women composers within the nineteenth century traditions of travelogues, memoirs, and studies of nature.[6] Von Glahn (2011, 402–403) argues that Beach's painstakingly precise transcriptions and lush, late-Romantic piano idiom unite two traditions of American naturalism.[7] First is a Romantic approach, awed by nature's power (as in the Hudson River School of painters) or meditating on it in an almost religious manner (as in the work of numerous poets, or the writings of the New England Transcendentalists).

The other approach is the scientific observations of ornithologists and biologists. Beach was diligent in her transcriptions, and as the footnote shown a moment ago indicates, she was proud of their accuracy. As she related in an interview several years after her first summer in Peterborough,

> I took the songs down at the bird's dictation and oh, how hard I worked! Even the most expert stenographer would have had difficulty keeping up with him! I took them exactly, even as to key (except for a few intervals too small to be transcribed) and rewrote and corrected as he sang them over and over. Then I played them back to him and he would answer.

Birdsong Transcription in the Early Twentieth Century

Beach's "ornithological" piano works can thus been read as both documentations of nature, and artistic responses to it. It is this observational, natural-scientific aspect of the "Hermit Thrush" pieces that I would like to contextualize next. Beach's hermit thrush pieces and the transcriptions that they feature so prominently arrived in the middle of an important debate within the study of birdsong. While this topic is too large to approach in a single conference paper, and is complex enough that I myself have only begun to scratch its surface, I will sketch the contours of the evolving scientific discourse surrounding the study and transcription of birdsong.

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[5] On Sill, "The Thrush," and Beach's affinity for notating the birdsongs she heard, see Block, *Amy Beach: Passionate Victorian*, 147–150; and Denise Von Glahn, *Music and the Skilful Listener: American Women Compose the Natural World* (Bloomington and Indianapolis: Indiana University Press, 2013), 40–41.

[6] Denise Von Glahn, *Music and the Skilful Listener*, 8–23.

[7] See Von Glahn, *Music and the Skilful Listener*, 41 – 43; and Von Glahn, "American Women and the Nature of Identity," *Journal of the American Musicological Society* 64/2 (2011): 402–403.

Biologists today generally use spectrographs in their studies of birdsong, capturing and annotating the spectrum of sound traced by each bird call. But before that technology became available, the debates within the early-twentieth-century ornithological community closely resemble musicological debates around notation, and particularly the practice of transcription. Among the most pressing questions were: should an observer use musical notation to record birdsong; precisely *how* should they employ it; and what might they hope to learn about a given song by notating it? Tied into this central issue are interlocking aesthetic and scientific questions: is birdsong *music*, in a human sense? What is gained, and what is lost, by treating it as such, both in an ontological sense and in terms of notation? How do experts—in both birds and music—share their insights with one another, and how to they communicate them to non-experts? Translated to other situations as applicable, many of these questions resonate with the very same issues that musicologists grappled with throughout the twentieth century and into the present day, so I hope that I can add some useful reflections based on the work of Beach and her contemporaries.

F. Schuyler Mathews's *Field Book of Wild Birds and Their Music* first appeared in 1904, and received a major update in 1921—the year that Beach wrote her "Hermit Thrush" pieces. Both editions start with "An Introduction to Bird Music," which begins as follows:

> There is a general idea among many who are interested in birds that musical notation employed as a means to express a bird's song is nearly worthless. Possibly those who are most skeptical in this regard are not the ones who read music readily. ... Of course it is a more or less problematic matter to deal with wild music. It is not amenable in any respect to law. However, the question involved is not whether the bird's song is radically different from ours—we may admit that point—but whether it may be truthfully and logically recorded upon the musical staff. That question, it is the object of this book to answer affirmatively, and with due regard for all the difficulties involved.[8]

Mathews's text is thus *full* of detailed transcriptions, most of which seek to fit birdsongs into harmonic and metric contexts. I unfortunately don't have much time to spend on his more provocative uses of notation—such as the piano accompaniments he sometimes offers, or when he compares various thrush songs to excerpts from Wagner and Strauss.

Mathews does not name any specific anti-notational sources in his introduction, but we can find the opposite view expressed widely as well, such as this article by Artetas Saunders:

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[8] F. Schuyler Mathews, *Field Book of Wild Birds and Their Music* (New York and London: G.P. Putnam's Sons, 1921), xxi.

> [Music notation] has been made primarily for the recording and rendering of human music, and birds do not usually sing to such standard. The musical scale gives no place for the recording of notes that are slightly sharp or flat. Its standards of time do not allow the record of a song that does not follow the rhythmic beat of its measures. Do birds sing in any given key? Do they recognize any fundamental notes? Can one beat time to a bird's song? ... The great majority of birds sing in a free, non-mechanical, natural manner that cannot be recorded on the musical scale with the exactness it deserves. If we have no better method we must resort to musical notation, but if we can find a better method, one which discards the mechanical rules of human music, without losing any of its scientific accracy, we can take a long step in advance toward the true scientific study of bird song.[9]

Here, Saunders raises several very cogent objections to notation, which resonate with musicological thinking about the ethics of transcription, and seems to anticipate the many innovations in twentieth century notation that would address problems like micro-intervals. Saunders mentions five aspects to which those studying birdsong might attend: pitch, duration, intensity, pronunciation, and quality. Intensity and quality, he admits, are both difficult to discern or represent objectively (being subject to factors such as the observer's distance from the bird).[10] Both aspects of birdsong are omitted from his transcriptions.

To approach the other facets, however, Saunders proposed a method of graphic notation that plots a song's pitch on the X axis, and time (measured in tenths of seconds) on the Y axis.[11] While Saunders notes that his system sets birdsong free from the keys implied in staff notation, his rendition of the twelve-note chromatic scale is still oriented around C major. Saunders's graphic notation is good at representing expressions like trills (the wavy lines). The "pronunciation" that he mentions in the paragraph quoted above includes the occasional percussive "k" sound, as well as less obvious enunciations, such as what Saunder's describes as a kind of "liquid l" sound. Those "L's" are the loops visible in his Figure 6. His system represents contour very clearly, and one of his demonstrations involves comparing similar song contours from the same species.

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[9] Artetas A. Saunders, "Some Suggestions for Better Methods of Recording and Studying Bird Songs," *The Auk* 32/2 (April 1915): 173–174.

[10] Of quality in particular, Saunders echoes the exasperation sometimes found in musicological discussions of timbre: "Concerning quality, I have no suggestions to offer farther than those already made by others. Sound qualities are baffling and difficult to describe with accuracy." Saunders, "Better Methods," 174.

[11] Artetas A. Saunders, "Some Suggestions for Better Methods of Recording Birdsong," *The Auk* 32/2 (1915): 173–183.

Figure: Artetas Saunders, transcription of a Robin's song, featuring "liquid l" consonants (the loops).

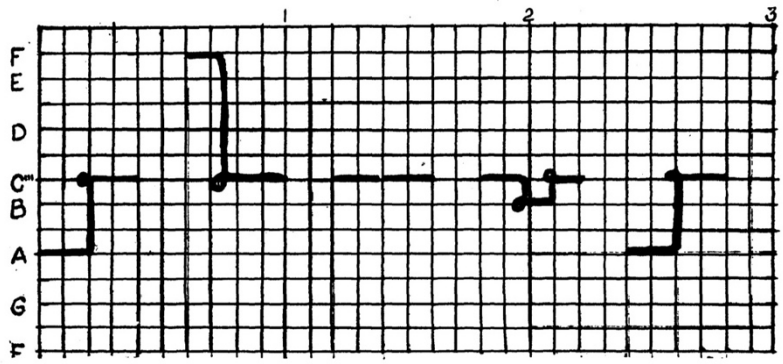

Fig. 6. Song of the Robin. West Haven, Conn., April 17, 1914, 5.30 P. M.

In 1924, William Wheeler and John Nicholls introduced *their* system of notation with a similar rationale to Saunders, focused on a slightly different set of musical concerns.

> Musical notation is almost out of the question in a case of this sort. Such notation does not clearly show the construction of the songs. It is the construction which the ear uses in differentiating one song from another, and which it is possible to represent graphically in a moderately satisfactory way. ... Of the four elements found in a Song Sparrow's song, namely, time, pitch, quality, and construction, although construction may be somewhat variable, we believe it is the most reliable factor on which to base a critical study.[12]

One word that stands out in this paragraph is "construction"; it seems to signify form, or more specifically the use of recognizable formulae. Wheeler and Nichols are interested in how the songs of an individual bird species resemble one another, and in the variations present across different iterations of those songs. They propose a system of graphic notation that in many ways resembles the neumes of Gregorian chant. This is one of their transcriptions, which shows eight different songs sung by one song sparrow in succession. Wheeler and Nichols's system does not reproduce precise pitch—in fact, they mention that they have not even recorded pitch information during their field observations—but instead sketches contour and gesture. As with chant notation, there is not a one-to-one correspondence between sound and symbol. The different formulae they employ make it clear what Wheeler and Nichols mean by "construction"—the eight songs in this family fall visibly into different families.

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[12] William C. Wheeler and John T. Nichols, "The Song of the Song Sparrow (A Systematic Study of Its Construction)," *The Auk* 41/3 (1924): 444.

Figure: Transcriptions from one individual Song Sparrow (cf. Wheeler and Nichols, p. 446)

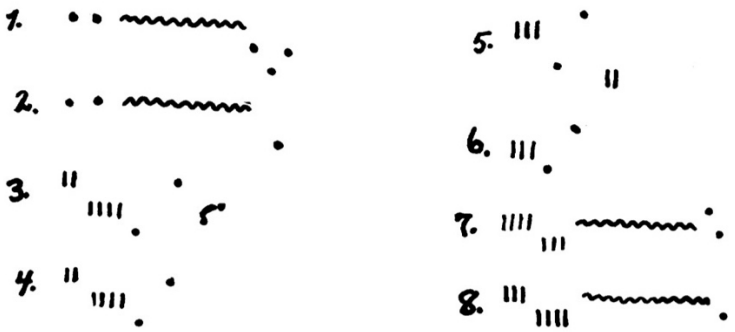


fig. 5

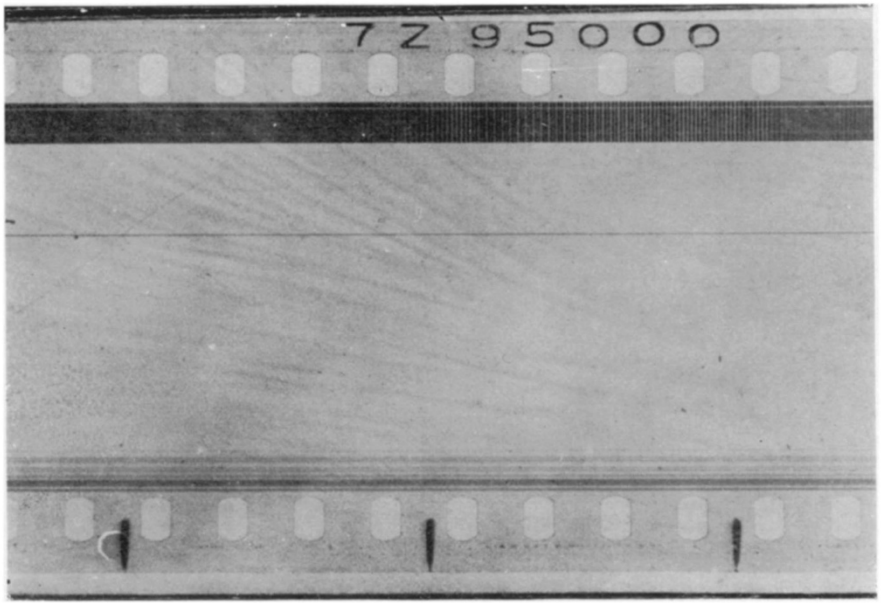
Optical Sound as Visualization

While many scholars of the time describe a process of careful, detailed listening, and others employ simple tools like a stopwatch, some scholars at the time turned to new technologies to visualize birdsong. In 1935 ornithologist Albert Brand turned to the emerging technology of sound film, and the optically encoded soundtracks that accompanied it, in order to transcribe and study birdsong.[13] Surprisingly, however, Brand was not interested in optical sound for its acoustic properties; while field recording for birdsong began to come into its own around this time as well, and would soon become an essential aid to transcription and analysis, Albert Brand was far more intrigued by film's ability to essentially "print" birdsong in its optical soundtrack, rendering it visible, at least to a certain extent.

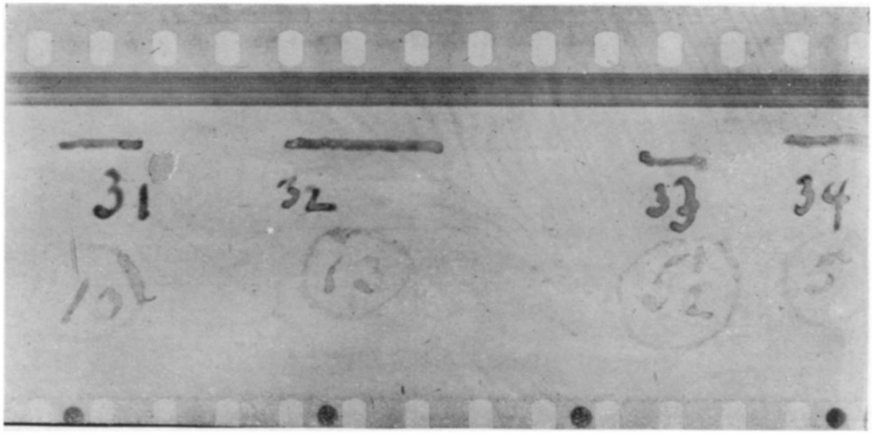
The first of Brand's images gives a clear example of what these soundtracks looked like—the alternations of dark and light vertical lines at the top of the frame show the actual grooves of the soundtrack. The hashes along the bottom mark out where frames *would* be, were there any visual information on this film. At one inch per hashmark, and eighteen inches flying by the aperture every second, this film strip represents roughly one sixth of a second.

[13] Brand used a form of optical film sound known as the Fox-Movietone system, which was one of several competing systems for optical sound in the 1920s and 30s. Developed by Theodore Case and Earl Sponable in upstate New York, Fox-Movietone is perhaps most famous for its use in the landmark sound newsreel of Charles Lindbergh's transatlantic flight in 1927See Masha Shpolberg, "Lindbergh's Engine: Hollywood's Transition to Sound and the Aviation Film." *Historical Journal of Film, Radio, and Television* (2019): 1–24.

Figure: Brand's Filmstrips, showing optical soundtracks (in dark gray) at top; on second filmstrip, annotations below in black marker (cf. Brand, "Method for the Intensive Study of Birdsong," p. 40, Plate V.)

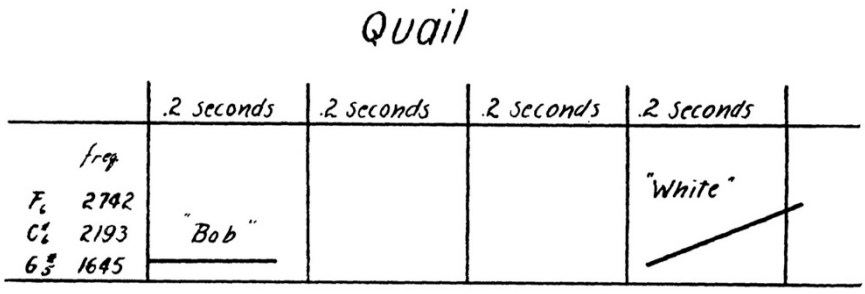


The soundtrack on the second example is much less visible to the naked eye—it appears as more of a gray smear with some bands of darker color throughout. But it demonstrates Brand's actual method of research: he relies not on his eyes, but on a microscope. Using 25x magnification and a micrometer, Brand would estimate the frequency of a bird's song by measuring its alternation of dark and light lines. This second slice of film shows a few of his annotations—he has drawn horizontal lines in black marker under each note, and has numbered them for their place in the sequence he is analyzing: these are notes 31 through 34. Recalling the time scale noted above, these four notes, and the silences between them, pass by in less than two-tenths of a second.



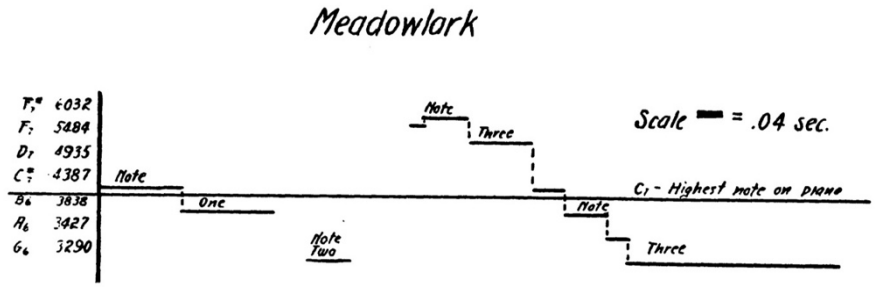
In the article, we don't ever get to *see* Brand's film strips through his microscope—presumably photographing them would have been technologically unfeasible at the time—but he describes his process as one of isolating each individual note, and then carefully examining the optical traces on the film in order to determine its frequency, and then its duration. The results of his analyses are then translated into visual representations that take several forms, according to the results Brand wishes to showcase; they are, in this way, a masterclass in early music informatics.

In his diagram of a quail's call, for instance, Brand includes a few frequencies for reference, and annotates the two notes with the common mneumonic for the call.



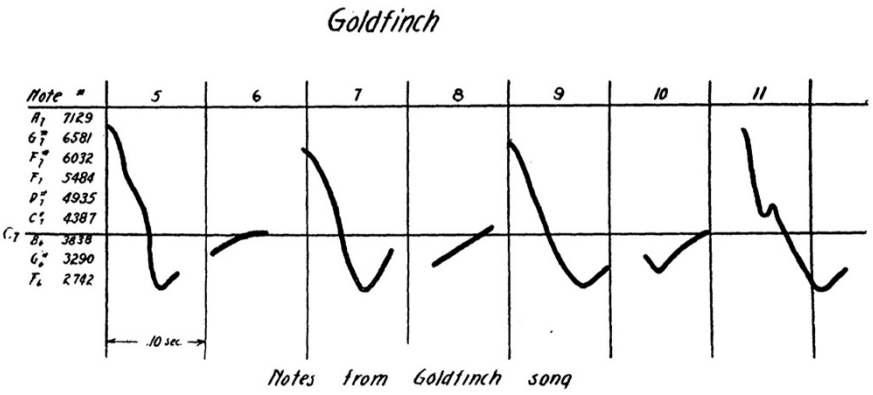
Graph of "Bob White" call of Quail

In his detailed diagram of a meadowlark's song, he again includes reference frequencies. Here, it is more obvious in the vertical space that the notes being transcribed fall between these quantized pitches. Instead of a horizontal grid, we get a legend of distance not unlike a map. The solid line in the center shows another benefit to this method that Brand mentions: even those birdsongs that are fully audible to humans, exceed the compass of common musical instruments.



Graph of Eastern Meadowlark's song drawn to scale
Variables: pitch and length of notes and intervals

Finally, his goldfinch transcription shows contour the most clearly, and captures the subtle variations between several versions of the same swooping figure.



With Brand's method of analysis comes his assertion that neither the unaided eye, nor the unaided ear, are sufficient for are insufficient to track the speed of many birdsongs. Comparing his own microscopic transcriptions to those from several publications by Artetas Saunders—whose graph paper transcriptions we have just heard about—Brand exalts in the level of detail he can see in his microscope.

> Our studies show that the individual notes in many bird songs are far more numerous than had been supposed. ... Two songs of the Winter Wren studied under the microscope show that an average of sixteen distinct notes ... were produced each second.
> Compare this with Artetas A. Saunders's report in 'Bird Song' ... His song is 7.20" long, practically the same length as my Song I; but he counts only five distinct notes compared with the 113 shown on my film.[14]

It is not only the speed at which these birds modulate their tones that escapes human audition, for Brand, but also the frequencies: he notes numerous pieces of evidence that certain notes in birdsong are beyond the range of human hearing, and argues that technological means can provide for a fuller and more accurate accounting of birdsong: optical soundtracks, as a form of prosthesis, could render visible what people cannot hear.

In this discussion, it is easy to detect echoes of the early experimental "microphones" that Carolyn Abbate has written about in her essay "Sound Object Lessons."[15] Such devices, named "microphones" by analogy to microscopes, sought to render audible the world's tiniest noises, which might otherwise remain inaudible to us. Abbate tells of an 1878 demonstration at the Royal Society in London transduced the seemingly silent footfalls of insects in a box into

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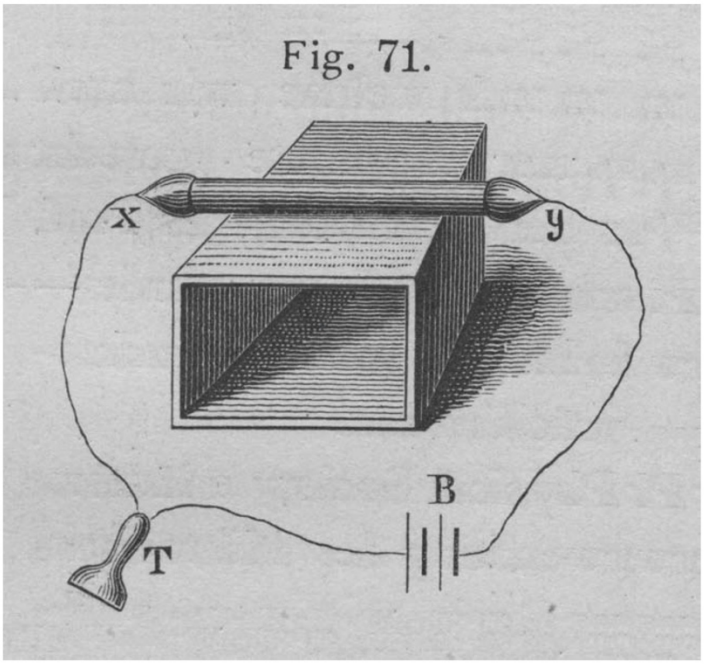
[14] Albert Brand, "A Method for the Intensive Study of Birdsong," *The Auk* 52/1 (1935): 42.

[15] Carolyn Abbate, "Sound Object Lessons," *Journal of the American Musicological Society* 69/3 (2016): 806–815.

something which an observer could hear through a small earpiece. Trained squarely on the previously inaudible spectra of the natural world, this original sense of "microphony" as scientific exploration remained in full effect for Brand, fifty years later, and is to some extent still a motivating factor in contemporary spectrographic analyses of birdsong.

Figure: Schematic of David Edward Hughes's microphone (1878). The operator listened at T, to the tiny sounds made within the box (Cf. Abbate's Figure 3, "Sound Object Lessons," 810.)

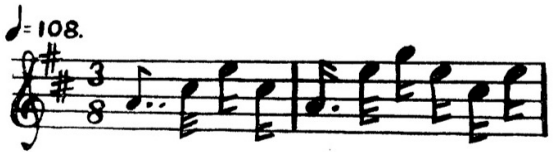


The Uses of Music Notation

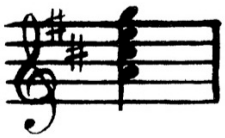
Having surveyed a few graphic approaches to birdsong, let's examine one more conventional transcription in detail—in particular, one concerned with the hermit thrush itself. In 1913, Maryland ornithologist Henry Oldys (1913, 538) described the hermit thrush's song as follows:

> The ordinary song of the Hermit Thrush is made up of different phrases each consisting of a sustained basal note followed by a run of higher, more rapid, and lighter notes composing a broken chord whose fundamental tone is the preceding sustained note. The second part of the phrase—the running notes—suggests the thought that a material

chord of glass has been shattered into fine bits and that the crystalline fragments come tinkling down through the leaves. ... Illustrations will make this description clearer:[16]



In this song the chord is:



Oldys's description of "a sustained basal note followed by a run of higher, more rapid, and lighter notes composing a broken chord" closely resembles the hermit thrush songs we have heard thus far, and it certainly resembles the way that Beach chose to notate her songs. Here and throughout the article, however, Oldys frequently conflates the "lowest note" with the fundamental of the chord. This is not generally the case; in fact, if I were to momentarily don my music theorist cap, I might point out that most of the fragments resemble seventh chords in the first inversion, and speculate that the resulting step near the top is an important feature of hermit thrush song. Oldys, however, moves quickly from these transcriptions to an account of a thrush singing a recognizable harmonic progression (Bm – Em – A7 – D) to argue for a direct connection between hermit thrush song, and human composition. Oldys writes, "there is no escape from the conclusion that the evolution of bird music independently parallels the evolution of human music and that such an evolution in each case is not fortuitous, but tends inevitably toward a fixed ideal."[17] Here, then, the use of musical notation privileges a single facet of music—harmony—and arrives uncritically at an anthropocentric conclusion by which that facet reinforces the western tonal system as natural and inevitable.

Curating Birdsong

Having surveyed a few of the other approaches to birdsong in the early twentieth century, let us conclude by returning to the "Hermit Thrush" pieces anew. As noted, Beach writes at the bottom of each score that the birdcalls have been reproduced exactly at pitch, down one octave;

[16] Henry Oldys, "A Remarkable Hermit Thrush Song." *The Auk* 30/4 (1913): 538.

[17] Oldys, "Remarkable Hermit Thrush Song," 541.

this is the documentary aspect that Von Glahn (2013, 402) finds so essential. What we don't know, however, is how Beach went about her transcriptions. It seems likely she would have used a notebook, or perhaps a sheaf of loose-leaf laying around her cabin. But that source unfortunately seem to be lost; while Beach's archives at the University of New Hampshire are extensive, the early MacDowell years fall into a twenty-year gap (from 1914 – 1934) for which no sketches are held.[18] Therefore we do not know whether Beach transcribed any other samples of birdsong that she did not employ in these pieces.

Presuming that Beach did keep a notebook of thrush songs, the question is then: what can we learn about the possible processes of transcribing, curating, and using these birdsongs from the compositions themselves? Did she select from the songs that she transcribed, or do the thrush songs in the two works represent the entire repertoire of her avian companion? Did she listen to one hermit thrush, or several? How did she choose to arrange the songs within the two works?

All of the birdsong excerpts used in the "Hermit Thrush" pieces are shown here, and listed in my digital handout. There are only nine different birdsongs between the two works. I am following the conventions used by ornithologist Donald Kroodsma, who applies letters to the songs that he catalogues. Most of the songs that appear in these two pieces are used more than once, and a few of them appear numerous times. Many of these birdsongs appear in both pieces, almost always in their full form. In one case, shown in Birdsong E, the same song appears with very slight variations. The melody from "Hermit Thrush at Morn" also appears, with slight variation, as song F. It seems very likely that this is also a birdsong transcription, or that it is based very closely upon a transcription. Though printed in full-sized notes, Beach seems to indicate with her footnote that it too comes from the Hermit Thrush. From a compositional perspective, it is interesting that several measures from "Morn" appear at precisely the same pitch level in "Eve" as well, because the two works are in radically mismatched keys: D minor and Eb minor. This fragment is right at home in the D minor tonic of "Hermit Thrush at Morn," but in "Eve," however, it sits uncomfortably within the flat-filled key signature, as the numerous natural signs indicate.

As I noted earlier, Beach's archives contain no sketches or notebooks from her encounters with the hermit thrush. But in order to understand how she used the songs, we can revisit her fragments from a more contemporary ornithological perspective. Recent observational studies of hermit thrush songs by James Rivers and Donald Kroodsma have demonstrated that New

[18] The Amy Beach Collection at the University of New Hampshire contains two sketchbooks (each from the mid-1930s, with one also containing several sketches from 1914) and numerous personal diaries, but none date from the time of the "Hermit Thrush" pieces.

England Hermit Thrushes have a "repertoire" of only 9 or 10 distinct songs at their command.[19] The library of bird songs quoted by Beach fits precisely within this number, raising the likelihood that her transcriptions exhaust the bird's repertoire. The manner of their arrangement, particularly in "Eve," is also suggestive of how hermit thrushes actually sing: Rivers and Kroodsma have found that they rotate through their repertoire of short songs, taking brief pauses in between and rarely repeating a call immediately. So, in the absence of documentary evidence from Beach's *Nachlass*, it may well be that the "hermit thrush" pieces themselves offer the complete record of Beach's forest companion.

Concluding Remarks

Finally, what can we learn from comparing Beach's transcriptions to other twentieth-century accounts of birdsong? First of all, Beach demonstrates a scientific interest in accuracy: in comparison to Oldys's block chords, she represents contour and pattern carefully, while Oldys is interested almost entirely in birdsong from a harmonic perspective. She is, in a certain sense, more scientific than the scientists, in that her notation captures detail that can then be reconstructed by others: data that can be reproduced, as it were. Beach's sequential presentation of Hermit Thrush songs, particularly in the interlude in "Eve," also represents one of the most important interests of the ornithologists of her time: studying variation among the songs of an individual bird. Wheeler and Nichols, for example, show us this with their page of transcriptions from a single Swallow. But their notation itself, like many of the graphic representations we've seen, is for specialists. To learn something about the birdsong, one must have a good idea what a sparrow's song sounds like already. Beach, by contrast, reproduces what may well be the entire song repertoire of her avian companion, and presents the songs back to back for her listener.

The purely visual and abstract nature of many graphic representations also reveals a key difference in motivation between a scientific and artistic orientation towards song transcription and analysis. The graphic systems of Brand, Saunders and Wheeler & Nichols facilitate the systematic study of musical *behaviors*, rather than of the songs themselves. That is to say, early 20th-century transcribers wanted to know about the repetition of various songs in a bird's repertoire, and the process by which characteristic gestures and formulae were concatenated into complete songs. They were in search of systematic operations, instinct, or characteristic musical tendencies with which they might categorize species or extrapolate other behaviors.

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[19] See James Rivers & Donald Kroodsma, "Singing Behavior of the Hermit Thrush," *Journal of Field Ornithology* 71/3 (2000): 468–470. The median for their sample is the same as its upper average (10), indicating that many New England thrushes knew significantly more than that number of songs. By contrast, thrushes in Arizona had between 6 and 12 unique songs in their repertoire, with a median of 8.5.

For Oldys and Beach, the songs themselves are the focus: for Oldys, they are evidence, often given in figured bass shorthand, while for Beach they are richly detailed musical portraits, made portable by their transcriptions.

While I do not wish to place Beach in opposition to her scientific contemporaries, or even with her musical precursors (like Athanasius Kircher's fanciful birds) or those who would follow later (most famously, Messiaen's *Catalogue d'Oiseux*), I hope that I have briefly shown how exceptionally detailed Beach's "hermit thrush" transcriptions are, and how understanding her compositional combination of documentary accuracy with artistic expression can best be understood by weaving together an interpretive context with evidence from influences and antecedents from both schools of thought.