

term “birdsong” is debatable, if by this we make the claim that nonhuman animals produce *music*, which is a canonical example of question begging. Naturalists still disagree even on *why* birds sing (Araya-Salas; Higgins 31-32; Rothenberg, *Why Birds Sing*; Taylor, *Is Birdsong Music?*), and they might be placed on a spectrum from the behaviorists and evolutionary biologists, who insist that the sounds birds make are no more than a territorial warning or a sexual invitation, to those who see or hear something *else*, some excessive exuberance, either approximately or exactly equivalent to our human act of singing for pleasure. Birdsong is, for such aficionados, perhaps even an analogy to art itself (Okanoya; Zeigler; Marler). They rightly lean on the venerable authority of Darwin here. For him, it is the voices of the *passeriformes*, the perching or singing birds, that explain nothing less than the evolution of the aesthetic. But they also follow the lead of Kant and his fulsome appreciation of the “free beauties of nature,” “*pulchritudo vaga*”: “things of nature into which no human has placed any meaning whatsoever” (cf. Figal 54, 55). This natural beauty might even be *more* sublime than human art, since “a bird’s song, which we can reduce to no musical rule, seems to have more freedom in it, and thus to offer more for taste, than the human voice singing in accordance with all the rules that the art of music prescribes” (Kant 73-74). Hegel, in his appreciation of the “blithe self-enjoyment” of the birds, sounds the same note, exactly: “voice is not a mere declaration of a need, no mere cry; on the contrary, bird-song is the disinterested utterance whose ultimate determination is the immediate enjoyment of self” (*Philosophy of Nature* 409).

The philosophers were drawn to the *natural* freedom of the birds, however, which severely restricted their appreciation of birdsong as *art*. The empyrean is a realm not

only far above human art, but entirely apart from humanity itself. Kant insists, for instance, that birdsong cannot be *imitated*. Mimicry is *artful*, but in all the wrong ways, so that the use of mechanical ingenuities to imitate the birds is a species of roguery and by definition the opposite of true art or beauty. Hegel returns to the consensus that imitation is *neither nature nor art*:

we soon get tired of a man who can imitate to perfection the warbling of the nightingale ... since from the free productive power of man we expect something quite different from such music which interests us only when, as is the case with the nightingale's warbling, it gushes forth purposeless from the bird's own life, like the voice of human feeling. (*Aesthetics* 43)

In short, the philosophers recognized birdsong as exemplary of the sublime, but they seem to maintain at all times a clear separation between animals and humans — and particularly from the latter's ingenious tricks and techniques. The long cultural conversation that Matthew Head has characterized as the “banishment of birdsong” (Head 16) culminates in an aesthetic appreciation that can only contrast sublime natural music with low human artifice, or else a merely mechanical nature with meaningful human art.

The scholars of birdsong today are far less wedded to the separation of nature and culture than their Enlightenment forebears. Indeed, they follow the tenor of our times by systematically critiquing the nature-culture binary. Hollis Taylor asks, rhetorically, “Does ‘nature’ need to be pitted against ‘culture’ and things human in order to make sense of it?” (13-14), before staking her zoomusicological analysis on the alternative of

“natureculture.” Rachel Mundy (*Animal Musicalities*) has similarly pointed to the limitations of pitting the primacy of human “culture” against the ambiguous charms of animal nature: her vision of “animanities” refuses the claims of human exceptionalism, and rediscovers the importance of birdsong for the emergence of musicology. Equally radical is Holly Watkins’s ambition (in *Musical Vitalities*) to relate musical practices to the natural world, taking in the “biotic arts” of other species; returning to the Romantic tradition, and to Schumann in particular, Watkins finds that in such exemplary work as “*Vogel als Prophet*,” “one cannot judge where the human music ends and the bird song begins” (“On Not Letting Sounds” 94; *Musical Vitalities* ch. 6).

Yet, even so, the centrality of human beings remains a dogged if no longer quite so dominant motif in the cultural history of birdsong. The nature/culture binary is routinely rejected, but it has not really been transcended, since the claims of *wildnature*, *pulchritudo vaga*, are arguably as privileged today as they were in Kant’s day. So, for instance, the philosopher David Rothenberg’s recent exploration of birdsong’s “‘humanimal’ soundscape” (*Nightingales* 62) salutes the music that humans and birds make together, even in, or especially in, the clamor of the city. Yet he draws our attention to the “resounding natural world that envelops us” (81), where he wistfully observes that “we are always only ourselves” (77). This is surely inevitable given the priority of the “wild” songbird (Rothenberg notes that his caged cousin is “a different animal altogether” [27]). Moreover, whilst the condemnation of mimicry is sounded much more faintly than in the Enlightenment, it is heard nonetheless: “if we are to join in with his music, we cannot copy him, but must learn from him while applying our own humanity to the connection” (125).

The central question of birdsong, the relation of human music to the animal kingdom, which has animated Western culture since at least the middle ages (Head), remains unanswered. Zoomusicology tends rather to recapitulate than to resolve the differentiation between natural science and cultural history (Rottner). Hollis Taylor and Dominique Lestel foresee the greatest advances in zoomusicology coming from *field* musicology, observing and recording animals in their natural environments. In the case of Taylor's prized pied butcherbird, this means the Australian outback, and she is at pains to say that the reality of nature distinct from culture is not negated by her natureculture perspective (15). Even where the exclusive claim of "humanity" to musicality has been unmasked as a transparently political artifact, such work has focused primarily on the sounds of wild birds in nature (Mundy, *Animal Musicalities*). Watkins's emphasis on hybrid human and animal expressivity ends on an inconclusive note, too, asking what Schumann's art has to do with real birds, birds that inhabit the "open-ended, multisensory environments of the outdoors" (Watkins, "On Not Letting Sounds" 95; *Musical Vitalities* ch. 6). Watkins might just as well wonder what a canary chirping an aria from Aida can tell us about the forest.

In this paper we wish to move away from this approach to birdsong, hampered or hamstrung as it is by the contrast between the sounds of wild birds and music made and heard by the only "intellectually engaged rational animal," *homo sapiens* (Leach 1). Our intention instead is to make a foray into birdsong's thoroughly *unnatural*, or rather, artificial history, emphasizing the ways in which birds' capabilities have long been modified by or with the assistance of human beings, through a range of practices and technologies, in a variety of performances, and in different spaces, not just the arboreal and the urban, often in transit and transition between the countryside and the city.

Birdsong still holds “a special position of awe and intrigue” (Levitin 264) for us, but we intend this brief genealogy of *artificial* birdsong (as we reluctantly term it to set it apart from what has been called *natural* birdsong, supposedly unaffected by human influence) to complement the work of the ethologists, neurobiologists, bioacousticians, and zoomusicologists.

The novelty of this argument rests on our emphasis on those practices in which humans, birds, and *artificial* birdsong become entangled. We focus first of all on the *training* of songbirds, before moving to the role of singing birds as *performing* animals, in settings ranging from the parlor to the stage, and finally to the critical importance of *technology*, primarily in the spheres of amplification, recording, and broadcasting. In this alternative history of birdsong in European culture (we draw here especially on Russian history), our avian exemplar is not the storied lark or nightingale (Mansfield; Randel; Rothenberg, *Nightingales*) but instead the humble *canary*. As an icon of birdsong, we are aware that the canary may cut a somewhat comical figure. However, as one of the most *transformed* songbirds, carefully bred, selected, and trained, especially for its singing ability, no better bird can be found. By bringing together the (nonhuman) animal, the human, and the machine, we aim more thoroughly to unsettle our inherited understanding of birdsong and to appreciate more fully the charms of the artificial. Paradoxically, given the catachresis of “birdsong,” an unfortunate side-effect of the elevation of “natural” birdsong to the status of music has been the depreciation of the music that animals and humans make together. If this is true, learning to understand, even to love, the song of the humble canary might be ever more salutary in an increasingly anthropogenic world.

2. A Training in Song

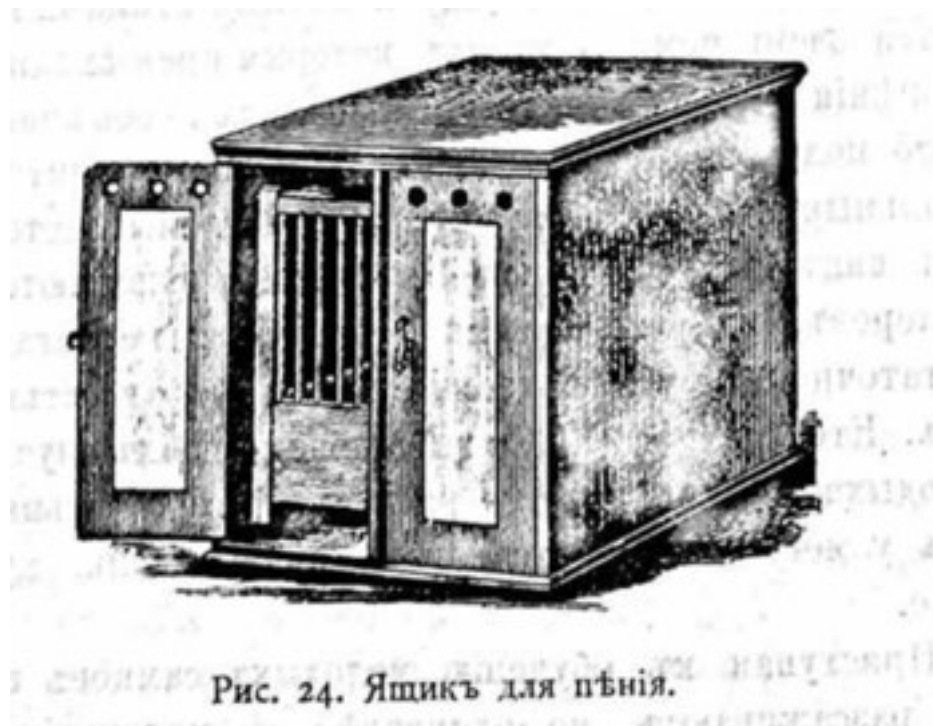


Figure 2. A box for teaching canaries, manufactured in Germany (Russ 130).

As our initial remarks suggest, birdsong has long been appreciated as a phenomenon of nature, but the role of the animal in the world of human culture has accordingly received limited attention. Human beings might be praised for their ingenuity, the only real source of aesthetic creativity and discernment, and appreciated in the production of music, but mimicry of nature is presented as mechanical, simple techniques or even low tricks that reproduce and render inane the purposelessly sublime sounds of (some) animals. The separation of nature from culture remains all but complete in this legacy, and it is difficult to shift any analysis of birdsong from this philosophically prejudicial ground. Birdsong might be cherished by humans viewed as intruders in a nature carefully quarantined or perceived as such, but it seems fated to be regarded with suspicion when it is blended with *techne*.

There is an alternative genealogy of birdsong, however, one in which nature and art are co-contaminated (Shell 95). For whilst birds sing, they also *learn* how to sing. Their tutors are sometimes other birds, not necessarily of the same species. Birds learn how to be heard even in the most unpropitious environments. Most importantly for our purpose, however, human beings can train birds to sing, teaching them entirely new songs. The question then is not the beauty of a pure nature so much as the meaning we should ascribe to this *artificial* birdsong. What is the significance of teaching nonhuman animals, possessors of beautiful voices of their own, to sing on command, or to sing more loudly or clearly, or to imitate the songs of other animals, including songs composed by human beings?

The training of songbirds has no great interest for the philosophers of aesthetics, nor for the majority of zoomusicologists referred to above, yet it is of vital significance for science. It is a practice which has attracted the attention of neuroscientists, cognitive and behavioral psychologists, ornithologists, and ecologists, all of whom attempt to bridge human and avian worlds (Specter). Such work recognizes that humans and birds are very similar in the way in which they register and learn vocal behavior. One of the earliest and the most remarkable of these studies was by the sixteenth-century Austrian ornithologist Count von Pernau, amongst the first to note that birds acquire their songs by learning from and interacting with their environments (Bertau; Birkhead & Van Balen; Stresemann). Notably, this learning and interaction was understood even then analogously to the way in which children acquire language. Contemporary neuroscientific analysis has confirmed the force of von Pernau's comparison (Jarvis; Kuhl). For cognitive and behavioral psychologists and neuroscientists, songbirds are "an important animal model for studying the sensorimotor mechanisms of vocal

learning and the processing of learned, complex sound sequences” (Bregman *et al* 1666). Behavioral experiments with songbirds help to throw light not only on how and why humans recognize and learn to manipulate melodies and language, but also on how the human brain functions more generally. Thanks to studies of the cheerful and ever melodically-curious canary, we know for instance about the process of neural replacement in brain tissues, leading directly to the new paradigm of neural plasticity, according to which the cells in the brain, be they human or canary, retain a far greater degree of functional flexibility than previously supposed (Nottebohm).

The groundbreaking discovery of neural plasticity made the canary one of the real heroes of modern neuroscientific inquiry. But long before, the canary was recognized by ornithologists and canary keepers as a remarkable bird because of its learning abilities, and also because the canary was so thoroughly *domesticated*. In contrast to many other songbirds (including the nightingale, lark, finch, warbler, and goldcrest), the canary is amenable to being kept in cages and bred in captivity (Shell 283). Better still, the canary sings throughout the year, and has a remarkable ability to transform and imitate virtually any sequence of pitches, whether produced by humans or other birds (Baptista and Gaunt). Granted, the song of the canary is less melodic and appears in shorter motifs than that of the much-prized nightingale, but it was a song that can easily be *modified*. In short, the canary is by far the better pupil. In words lent by a 1799 moral homily, *The Canary-Bird*, to its avian hero:

I spend the morning, very frequently, in emulating [my master’s singing] voice. This I cannot do — but the attempt has considerably improved my own. We cannot all reach excellence; but if we try to do so, we shall approach much nearer than if we make no effort. (Kendall 33)

From at least the early eighteenth century, training canaries to sing specific tunes and to imitate particular sounds became so popular that the practice soon outgrew the amateur tradition of middle-class tutors playing pipes or flageolets to train their birds, becoming an industry and an international trade. Differences between countries, districts, and individuals should not be overlooked, but the contrast between German and Russian breeders as the principal trading centers in Europe is instructive. Germany and Russia moved simultaneously away from primarily appreciating the *appearance* of the bird towards valuing canaries for their singing ability and proficiency in acquiring new songs. The German singing canary industry was centered in the Harz mountains, and in the town of St. Andreasberg. By the end of the nineteenth century, the region exported more than 150,000 “Harzer” or “roller” canaries each year (Birkhead 36). In the Russian Empire, less famously, a smaller but still significant local canary trade arose around one breed—the *ovsînochnaïa* canary (cf. Petri) — developed from crossing the European canary with local wild birds. With major breeding centers in the Kaluga, Tula, and Borovsk Administrative Districts, the trade reached its peak at the end of the nineteenth century, when a single village in one of these districts could deliver more than 4,000 male canaries a year to keepers in Moscow and St. Petersburg alone (Vladimirskiï 614; Markova; Mitîurnikov, “S’ezd Russkikh Ptitsevodov”; Nevskiï; Kulagin).

Breeders from these two countries developed quite distinct training techniques, some of which were analogous, others locally distinct. Both German and Russian breeders lavished their attentions on the best singers from amongst their flocks. German breeders, however, recognized and exploited the role of light exposure in song learning. In empirical trials, they anticipated the neuroscientific link between light exposure,

hormone production, and the quality of a bird's song. German techniques were cruelly effective: by keeping canaries in dark wooden boxes with small airholes (Figure 2), breeders produced the best conditions for canary learning by focusing the birds' attention on auditory stimulation and thereby inducing them to imitate the tunes and sounds to which they were exposed. The famous "nightingale canaries" of the early twentieth-century German breeder Karl Reich were reared in precisely this fashion. In Russia, breeders seemed to be aware of the German techniques, but consciously avoided them (Mitûrnikov, "Dobroe Slovo" 175). They instead exposed their canaries to the sounds of local wild birds: young canary chicks were placed next to a cage with their wild cousins during the process of training.

In both Germany and Russia, canary breeders determined to bring the sounds of nature to urban households, sounds which would serve as "an antidote to the noise of urban crowds," though here too there are differences of emphasis. As Jacob Smith observes, the German roller canary "was associated with the European countryside, pure air and clean water, bubbling brooks, tinkling bells, and the peaceful, evening tones of the nightingale" (50). Analogously, the songs of the Russian *ovsîanka* "consist entirely of the tunes of our wild birds of the forest and other areas: canaries sing with tomtits, sandpipers, wood larks, white-throats, and yellow-hammers," as Ivan Mitûrnikov, a late-nineteenth-century canary fancier from St. Petersburg, explained (172). Be it inanimate nature in the case of German canaries, or wild birds in the case of Russian canaries, however, in both countries canaries were prized for their ability to selectively *imitate* what their human companions regarded as the sounds of nature, something that at a stroke differentiates the appreciation of the bird's song from the grander notions of Kant or Hegel. The "Water Gluck," for instance, a sound produced by

the German roller, reminded listeners of “a little drop of water falling into [a pool of] water” (Gutierrez 78). And whilst the sound of water is generic, the Russian canaries were also understood by contemporary fanciers to capture distinctively local environments. “In the Russian canary,” Mituîrnikov writes, “you feel its Russian nature”; it “does not belt out just any sort of ballad, but throws in sounds, plays with them, makes the most unexpected transitions.... In each bar, one can hear the expanse and depth, which almost visibly characterize [the bird’s] nationality” (172-173). German and Russian manuals for canary breeding and training reinforce the idea that the song of the canary is to be *developed* as a musical quotation from an idealized natural soundscape, evidently intended as a remedy for listeners alienated from nature.

In the “artificial” song of the canary, then, produced by these human-administered training routines, the worlds of culture and nature appear hardly separable at all. In the case of both German and Russian canaries, the practice of training implies the collaboration between the bird, the human trainer, and the urban market for which a set of songs is specifically adapted. In case of the Russian canary this network extends to yet another actor, for the *ovsîanka* tune is borrowed from a wild bird, the yellow-hammer. The canary served as a kind of recording device, enabling the transmission of certain carefully selected sounds of nature to distant urban households. The canary here is a somewhat involuntary participant, indeed one whose musical repertoire is assembled and authorized by a human-constructed network and maintained in carefully controlled bounds.

These training techniques relied on the pronounced malleability of the canary’s song, even if the underlying neurological phenomena would only be “scientifically” studied in

the twentieth century. While most songbirds have several genetically inscribed templates of what they should sing, the canary's templates are more flexible than those of almost all other species of bird. The training introduced by German and Russian breeders relied on the bird's natural propensity to quote and imitate sounds from its surroundings. Ornithologists and amateur naturalists had known for centuries that birds extend their repertoires through imitation of fragments of the sounds they hear, notably the songs of other birds, including those of other species.

Charles Wittchell was one of the first to spot the importance of mimicry in birds (Zon 71-74). In his pioneering 1896 work, *The Evolution of Bird-Song*, Wittchell concluded that "we need not wonder that the cries of birds are so often somewhat similar to the sounds that the birds themselves experience daily ..., and the voice of the bird has been then attuned to harmony with neighbouring sounds, just as its colours so often blend with those of its surroundings" (229). Though a somewhat skeptical evolutionist, Wittchell accepted that the ability of birds to mimic natural sounds and the cries of other birds were evidence of an adaptation to their environment and a product of natural selection, and subsequent studies assume that mimicry might be most common among birds who need to communicate across long distance, to distract predators, or to lure prey. We also know that some birds like the marsh warbler or the European starling are particularly capable mimics, whilst other birds keep their repertoires relatively "clean" of external musical appropriations. There are still more questions than answers about the way in which mimicry works in the avian world (Rothenberg, *Why Birds Sing* 113), but the point is clear: mimicry happens in nature, not only in the world of human artifice and training.

We should nevertheless emphasize the abilities of the canary, of all singing birds perhaps the most remarkable of musicians. We should not dismiss the canary's agency just because it is the object of elaborate breeding and training. The canary's unparalleled capacity for imitation is the *sine qua non*. In modern parlance, the canary is an "open learner." In perhaps more contentious phrasing, the canary shares a fundamental trait of "musicality" with both wild birds and human tutors. As training manuals attest, the canary picks up tunes from wild birds and does so voluntarily, not to say eagerly, but the selection of tunes is difficult for the human trainer to prescribe (Launer and Grosse; Mitîurnikov, "Dobroe Slovo"; Nevskiî). Indeed, breeding and training routines interacted with the canary's vagaries by exposing young canaries only to those among their elders who primarily sang melodies that the trainers found attractive. We might conceive of a complex dynamic between human and avian species, all the time attuned to the demands of the canary's potential human audience.

Since canaries were bred to perform, we need to understand the demands placed upon the bird and its trainers by the consumer and the market. These command performances are what we must consider next.

3. The Songbird as Performer



Figure 3. A girl with a canary (Pervye Kanareïki).

Though his pet starling is rather better known (cf. Haupt; West and King), as a child in Salzburg Mozart had loved canaries most of all, and at the very end of his life he had a canary near him, though he is reported to have had it removed, as, heartbroken, he could no longer bear to hear its song (Abert). As with all the German and Russian canaries we have discussed, these birds were bred and trained to perform. They create, as Meredith West and Andrew King have argued, a “shared environment with another species” (113), and their musicality is more beguiling than the fragmentary mimicry of a parrot, say. Musical ability was the quality selected for and developed by breeders and trainers who prepared canaries and other birds for their careers as performers in the households and public spaces of human habitation. Mozart’s starling was perhaps already able to whistle

a motif from the Concerto in G major (K453) when Mozart bought him; this may be what attracted the maestro in the first instance.

Birds are also musical collaborators: Mozart's Musical Joke ("Ein Musikalischer Spaß," K522), completed a few days after the bird's demise, carries what has been called "the autograph of a starling" (West and King). Even so, it is too easy to overlook the songbird in the corner of the room, this captive artiste. Caged birds as performing animals have not attracted much attention from either animal studies or natural science. The fashion for caged birds has been well discussed, but for all the world as if birds were as much a part of the domestic furniture as their cages (Robbins; Breittruck). Those who do write about birdsong focus mainly on the analogy between birdsong and man-made music, attempting to explain from a scientific or an aesthetic perspective why birds sing; or else they ask what birdsong *means* to humans, how it became "a sign of humanity's ability to reason objectively," as Rachel Mundy puts it ("Birdsong" 206). It is hard to escape the gravitational pull of anthropocentrism, Kant's concern with the aesthetic *perception* of birdsong by humans. Yet if we consider the nature of animal *performance*, a new set of questions about the relationship between birdsong and animal-human companionship might emerge.

Though the songbird's music is an ancient theme, it is important to emphasize that the performing *canary* is a relatively recent phenomenon. When canaries first appeared in Europe in the fifteenth century, they were valued only for their exotic and colorful appearance. During this period, as Tim Birkhead informs us, men gave birds, including canaries, to women as courtship gifts (18-19). The birds were luxurious presents for aristocratic or well-to-do women who not only kept birds in cages in their parlors, but

sometimes wore them on their bodies as living ornaments. This decorative role only began to change in the middle of the eighteenth century. The fashion for harnessing birds' singing abilities became historically visible with the training regimes of Joseph-Charles Chastanier Hervieux de Chanteloup. Hervieux de Chanteloup organized the first-ever canary *concerts*, for the entertainment of the Princess de Conde and her family. From this point on, the canary came quickly to be recognized as more than just a beautiful *thing*, an addition to a lady's wardrobe or a lively element of interior design. The songbird was now established as a *performer*, a musician, even an *artiste*.

The precise nature of these canary performances is more difficult to gauge, however. If we follow Una Chaudhuri and Holly Hughes's line of inquiry regarding animal performances as *animal acts*, "records of and reflections on the relationships — real and imagined — between human and nonhuman animals" (6), we are instructed to consider the social setting, albeit a more-than-human one, in which the canary's performance is framed. Here, the meaning that is being composed is very different, from, say, a display of "exotic" nature, a tableau of the "imagined geography of wildness" (Tait 3). Instead, canary performances are predominantly domestic, though this does not preclude the elaborate choreographies of nonhuman propensities and human direction. A canary grown accustomed to sitting on the shoulder or the finger of its keeper is one thing, one kind of performance, but a canary quoting the gurgling of a mountain stream or the chirp of a wild bird is something else, as is one singing an aria from *Rigoletto*. Since opportunities for musical entertainment were more limited than they are today, caged starlings, canaries, and other birds were widely deployed as "organismal technologies that produced ambient music at home," as Jacob Smith puts it (50).

Canaries trained to render popular melodies eventually moved from the parlor to the theatrical stage (Birkhead 46). Interspecies performances were conditioned not just by human artifice and the birds' innate or individual propensity to learn, but also by the environments in which and for which such collaboration took place. Canary keeping was certainly an urban fashion (in contrast to the breeding and initial training, which were carried out more conveniently outside the city) necessitating complex logistical arrangements, all preliminary to the hallmark performances of the avian artiste. The delivery of songbirds to the city necessitated further training, in venues such as pubs and coffee houses, or in bird shows, in addition to their established role in urban households. This training may seem mechanical to the more Cartesian-minded, but songbirds, particularly canaries, had to be carefully cultivated and encouraged to fulfil their prodigious musical promise. It is precisely the interactive nature of their musical ability that is at the heart of their appeal as performing animals. Casting birds in human-orchestrated performances involves living creatures, and singing canaries could be as temperamental as any diva.

Animal performances became the aim and indeed obsession of societies of enthusiasts, sometimes in the villages, but mainly in the cities (certainly the latter have left far more in the way of records). The first urban societies of canary breeders, keepers, and enthusiasts began to emerge in Europe in the early eighteenth century, especially in England, Germany, and France (Birkhead; Rothfels). In Russia, despite the success of rural breeders, such formal organizations were established much later, with the first records known to us dating to the late nineteenth century. According to Birkhead, and Rothfels (106), urban canary fanciers first organized themselves in informal groups,

exchanging tips and observations about selective breeding and systematic training, later developing regular bird shows in coffee houses and inns. As these societies became gradually more formalized, they establish criteria by which to judge the success of their animals' performances. Rules were codified, specifying the conduct of bird shows, the criteria for prize selection, and the proper relationship between animal and keeper. These codes are a distinctive aspect of animal-human performances: as Donna Haraway points out, seemingly arbitrary conventions are the definition of the "rule-bound, skilled, comparatively evaluated performance" (220), that is *sport*. Historical manuals for canary breeding and rearing stress the importance of dominant human authority and intentionality as the basis for these human-animal performances: these singing canaries are there to be judged by humans, after all. It is the human who "decides ... what the acceptable criteria of performance will be" (221).

Yet the animal is still the star performer, and performances could not be rote or routine. Russian manuals note for instance that prized performers might fall silent in an unfamiliar environment, such as a coffee house or pub. These manuals, emphasizing the relational hierarchy in the cooperation between bird and keeper, concur that where a performance fails to take place, it is the keepers who are to blame, not the birds themselves. The keepers or handlers are censured for failing to establish a sufficiently comforting and supportive relationship with their birds, implying that with sufficient skill and "good" intentions a winning performance might have taken place. In the most grand and prominent bird shows in Imperial Russia, held in St. Petersburg and Moscow, judges and participants recognized that great performance rested on far more than careful preparation and expert knowledge, however. One manual from 1898 explicitly acknowledged the fact that it remained excruciatingly difficult to predict which bird

might deliver a prize-winning performance on which day. In fact, even with regard to acknowledged star performers, the experts — to their shame — could never guarantee that a given bird would even sing on a particular occasion. It might remain stubbornly mute instead (Shanin 40-41).

The broader choreography of bird performances reveals the exacting level of care that was taken to minimize such capricious behavior. As bird show manuals and records indicate, each keeper would deliver their birds in their cages to the main exhibition hall or room. The birds were brought into a separate room one by one to perform in front of a jury, since “in case of their collective presentation by several keepers at once, the birds become heated, go mad, get distracted, or simply fall silent altogether in the company of other birds” (Savenkov 22). Keepers were typically permitted to be present for the bird’s performance, but they had to remain silent. On one occasion, as a competition report from 1903 informs us, the birds were set to sing in the evening, with the use of artificial light, but under these unfamiliar circumstances, many canaries sang reluctantly or refused to sing at all; those that did “sang in dampened fashion and frequently interrupted their song” (Brashnin 25). Even the star performers failed to deliver. The champion canaries brought by a legendary Moscow canary fancier, N. Shaliadov, put in uncharacteristically and unexpectedly poor performances: “in the evening’s [artificial] light [they] noticeably slurred their songs and in the morning sang much better” (26).

In these reports, much in the canaries’ performances is attributed to the influence of a human-controlled *environments*, but whilst conditions might be manipulated to improve the likelihood of a successful animal performance, the last word always remained with the avian performers. For instance, the proximity of the birds to one another at shows

was frequently cited as an important environmental factor influencing the quality of canaries' song. Similarly, while canary fanciers were unanimous in their enthusiasm for singing competitions, some of them noted with regret that the ever-increasing crowds and the noise they produced "scared the birds" into poor performances. So, the essential role of human intentionality meant in practice the translation of the desired choreography of a performance into rewards, such as treats, to which the bird might respond in the desired way. The role of human beings, individually and collectively, was to respond to and sometimes compensate for the effects of the canary's predispositions and performance preparation.

These environmental factors influencing the birdsong produced at the nexus of the bird's innate abilities and human intentionality were much discussed in publications catering to bird fanciers and ornithological experts. In St. Petersburg's harsh climate, for instance, loss of voice was a widespread and frequently noted concern. A well-known breeder, Ivan Mit'urnikov, in an keynote speech to the Society of Russian Bird Breeders in 1892 claimed that "in St. Petersburg there are many complaints about hoarseness of canaries" (352-353), and went on to outline a supposedly scientifically informed program or therapy for combatting this affliction.

In domestic environments, avian performances naturally had a somewhat different meaning. Canaries and their songs became fashionable as decorative and acoustic elements of many late nineteenth-century households, perhaps as a symbolically urban expression of the harnessing of nature to human purpose. The fashion for the domestic canary emerged in Russia only at the turn of the nineteenth century, but if late, it was no less pronounced than its European precedents: "It is an aspiration in modern society to

meet the demands of a cult of beauty and elegance in the home, where we often find – caressing our eyes between green foliage – a cage with representatives of the feathered kingdom. Among these, the first place is securely occupied by the canary” (“Akvarium” 7). One well known late nineteenth-century Russian breeder and trainer, Maria Markova, claimed that the number of canaries sold in urban markets in the city had increased steadily, year by year (67), though she added the caveat that many of these birds were valued primarily for their appearance, rather than their musical companionship.

Still, we should be wary of disregarding the domestic environment as a site of the singing performance and the interspecies collaboration that produced it. Just as significant as the importation of trained canaries from countryside breeders and canary-production regions was a trend towards ever more intensive de-centralized domestic training routines, or continued education for birds brought to the city. As knowledge about canary training began to be disseminated by expert societies and publications, more and more urban domestic birds developed all or part of their repertoire *after* arrival to their permanent urban abodes. Whilst much less is known of these domestic performances than about those at bird shows, they are occasionally described in print journals carrying articles for and by canary enthusiasts. They indicate an ever-greater emphasis on the canaries’ ability to sing their keepers’ favorite motifs and tunes, learned and rendered repetitively over the companion animal’s lifetime. These melodies turned the city room or apartment into a liminal space where nature and culture blended into a uniquely urban amalgam. In the urban home, the canary’s song begins to function as a domestic musical device, shaped collaboratively and collectively by human and avian residents. Here, once again, subtle intentional or unintentional changes in the domestic environment could significantly modify a canary’s performance, influencing pitch, duration, frequency of

repetition, melody, and rhythm. These environmental factors could be managed by human residents, but never fully controlled, as an awareness by the human keeper of their influence on the bird's song became more subtle.

In the home as at bird shows, the care lavished on the canary by its owners was considered a fundamental precondition for effective animal performance, and an important manageable contingency determining the artificial accomplishments of the urban songbird. By placing an animal in an environment different from its wild habitat, the human collaborator assumed responsibility for their protégé. Birdsong performance meant the cultivation of a relationship with the canary or other singing bird, care for its welfare as a living creature rather than a mechanical object, acceptance of its whims and caprices as well as of its innate ability to sing or mimic music. The canary was not a music-box toy or novelty, however much the mechanists valued reliability.

4. Birdsong: Technology and Artifice



Figure 4. Disc label for "The Birds and the Brook" (Tipp).

In his study of Stravinsky, Daniel Albright suggests that Stravinsky's music is concerned with "the deep equivalence of the natural and the artificial" (4). This is illustrated in Stravinsky's short opera "The Nightingale," which re-tells the fairytale written by Hans Christian Andersen about a Chinese emperor and two nightingales, one real, the other a mechanical toy. It is the latter which emerges victorious from a singing competition, albeit provisionally. The distinction between *natura naturans* (the independent creative power of Nature), and *natura naturata* (the imitation of natural sounds such as birdsong) (cf. Harley) is dramatized, but in Stravinsky's rendering, nature is irretrievably interpenetrated by art or artifice. Because both birds *sound* to the audience equally artificial, the opera suggests "that in music, no natural system can exist" (Albright 24). Artifice and nature are "most intimate" companions, "as if each were the culmination of the other" (8).

We return to the importance of the human, and the nature of artifice, in the final section of this paper, exploring the status of recorded performance of birdsong, the relationship between the bird singers and the human audience mediated through technology, asking: what difference does it make if a bird's song is heard in recorded form, or amplified and mixed with human musicians, or modified in some other way? Does it, as the philosophers seem to have thought, add an odious element of artifice, even kitsch, and so in itself negates the aesthetic beauty of birdsong? Or might this artifice itself become an object of wonder over and above the human or animal voice in its unadulterated state? More recent technological progress in sound amplification, recording, and broadcasting has had such a transformational impact on birdsong and human-animal musical

collaboration that we incline to the latter, again turning to our canary protagonist as exemplar.

In the previous section, we used the word “performance” or “animal act” without any further elaboration, which suggests that any canary chirping in human company would constitute a performance. Whilst this may be an excessively broad definition, it does serve to emphasize the fact that animal acts depend on human audiences for their significance (Tait). “That which makes music an art is that which separates it from nature and the natural voices of birds,” argues Elizabeth Leach (3), following the medieval discussion of birdsong. Music is not just sound, in other words, and musical performance and appreciation are indispensable elements of true art. Leach goes on to say that the “performer of music is under an obligation not just to make musical sounds but to understand them as music, that is, as proportions that are rational. The listener is also under an obligation to understand sounds in this way, whether or not their performing agent does so.” However much we underline the ability and temperament of the avian artist, for most of the history of the appreciation of birdsong it is the meaning ascribed to it by human cultures that takes center stage, most clearly where human perception of animal musicality is concerned. Only very recently has this cultural emphasis on the idea that music appreciation is a uniquely human cognitive function, and hence its anthropocentrism, been challenged. But, somewhat paradoxically, this is made possible by the importance ascribed to *technology*. The shift from music’s rationality to its emotional impact has, in the modern age, directed attention to sound itself. As Elizabeth Leach stresses, this has been made possible in large part by the invention of sound recording (276). If this argument is right, it is human beings’ technical ingenuity in removing the necessary co-presence of performer and audience that has intuitively

weakened the sense that sound is not music until it becomes the subject of a human audience's appreciation. One might say, there is music on the record, regardless of whether it is played to an audience of human or non-human animals or, for that matter, anyone at all. A performance, therefore, can take place without a human audience and yet remain intrinsically musical. This appreciation of the recorded event as having not only a market value but a cultural significance shifts the emphasis from the listener to the star performer, the bird singer. In the case of the canary, this was never just the canary, however. The human-avian partnership extends now not just to the husbandry and preparation of the performers in many cases, but also to the arrangement and distribution of the recording itself.

The earliest recordings of birdsong date back to 1889, when a German canary breeder named Ludwig Koch made a pioneering recording of a captive common shama on an Edison wax cylinder (Boswall and Couzens 925). Edison himself anticipated the phonograph's use in transmitting the sounds of nature, birdsongs in particular: "for amusement or instruction the phonogram can be of a dog's bark, a rooster's crow, a bird's song, a horse's neigh, a lion's roar, and the like, and the phonogram can be used in a toy animal with a single phonet for the reproduction of the original sound" (Edison cited in Boswall and Couzens 925). These recordings were made in significant numbers and widely distributed. The fashion of recorded song — as a training device or for the immediate joy of the listener — was transitory but pronounced, indicating that artificial birdsong held a distinct appeal for a significant audience. In an age of unfettered faith in the ability of science and technology to support infinite human progress, it was possible — indeed authorized — to disdain the innate biological mechanisms shared by humans and animals, which is to say the voice, in comparison with the machines or

instruments that human ingenuity could already, or soon hoped to, manufacture. Not only musical instruments, but also music boxes, toys that for instance imitated birdsong, have come to be prized above or alongside the avian original. This is so even when mechanical creations turn tutor, as with the bird organs or serinettes used to teach birds musical tunes. In this way, the bird is, arguably, enhanced by itself becoming little more than a “bio-machine,” whilst the machines made by craft become wondrous novelties.

The relationship between the natural singer and the machine is notably complex, but was commercially successful in the heyday of bird recordings. At the other end of the spectrum, with regard to recordings of birds in their wild habitats, we again note the difficulty of filtering out Kant’s “free beauties of nature” from the contamination of humankind and its mechanical creations. If we allow these complexities, however, which are after all not only a matter of technology but also of conscious selection, performance, and setting, if not in most cases also quite prominently breeding and training, where does this leave our understanding of the role of human orchestration and technology? If birdsong’s “artificiality” is accepted, what are the implications for our appreciation of the relationship between human beings and birds? Given the scope of our inquiry, the performances we have already described or alluded to in this paper evidence complex human-nonhuman animal collaboration. By definition, this collaboration inserts human design and preference into a native animal propensity, and technology may facilitate the relationship between species, not just making the voice of the bird more audible to remote audiences.

Considering the application of technology to our interactions with animals, Rachel Mundy has written of the significance of the sound spectrograph in ornithological research,

introduced in the 1950s. Mundy draws an important distinction between the subjective, aesthetic experience of sounds and the supposedly objective visualization of data in the form of standardized visual representations, or so-called “spectrograms,” which rendered the sounds of different birds in various environments comparable and transliterated them from birds’ beaks to human eyes. Unlike some of her predecessors who unequivocally announced the triumph of “avian bioacoustics” (cf. Baptista and Gaunt), Mundy offers no such endorsement, continuing to recognize the importance of auditory or perhaps musical appreciation in any discussion of birdsong. Drawing on Science and Technology Studies, she argues that technological advances retain aesthetic framing even where their intent is to achieve a higher degree of objectivity. In her view, and in ours, birdsong is also being performed or at least mediated by this technology, rather than simply deciphered. Indeed, the co-creation of the nonhuman singer, the human observer, and the machine is precisely Mundy’s theme (*Animal Musicalities*).

Importantly, the integration of human technology and birdsong became a success only after some maturation of the technologies involved. The era of acoustic recording presented significant difficulties in isolating and sufficiently amplifying the small voices of the birds. Technology had to improve beyond its initial stage, and the right bird also had to be bred or discovered, a vocalist prepared to perch next to a recording device and sing its song on cue, all the while sounding quite “natural.” Here, the real breakthrough came in 1910, when a famous canary breeder from Bremen, Karl Reich, began recording trained and captive nightingales and the so-called nightingale-canaries (that is, canaries trained to sing like nightingales). According to Birkhead, Reich “must have had a truly magical touch, for he persuaded one particular nightingale to perch and sing right *inside* the horn of the recording machine” (43, emphasis in original). The success of

Reich's training regimen provided the first conclusive evidence that sound alone was sufficient for a bird of one species to learn the song of another (Coperland, Boswall and Petts). These recordings became wildly popular not only with canary keepers, eager to train their canaries to sing like the much-loved and yet elusive nightingales, but also with bird enthusiasts more than happy to substitute a recorded rendition for a live bird (the market was evidently less snobbish than Kant presumed). Reich's recordings were sold across Europe, Russia and North America, illustrating what Birkhead calls "the dual miracle of modern technology and evolution" (43).

Building on Reich's pioneering work and its reception not just as a training technology, but also as musical entertainment in its own right, musical publishers drew upon increasingly sophisticated recording technology, microphones, and loudspeakers used to capture sounds from a broader sonic space, with a new degree of precision and clarity. This technological progress enabled joint recordings of birds and human musicians (Bruyninckx). Live birds, who had already been enrolled as novelty acts in the music hall and vaudeville, might be enhanced on stage *alongside* pre-recorded music, as with "Musical Dawson" and his "Choir of Canaries" in 1930s Britain (Tipp). Against the background of a pre-recorded small orchestra, the canaries in their birdcages provided the live vocal performance. But their voices too might be recorded, exemplifying the use of technology to preserve and render joint human-animal-machine musical performances. Dawson released eleven records of his canary choir, the birds accompanying the orchestral rendition of such standards as "The Blue Danube" and "O Sole Mio." His star performers were even promoted by name, having been carefully selected and trained. They included "Little Tweet" and the "Canary Caruso," whose solo

performances of “Bells of St Mary’s” and “Londonderry Air” were released by the Edison Bell record label in 1929.

The phenomenon of birds singing along with human-made music suggests that the boundaries between nature and technology are, as predicted by Stravinsky’s *Nightingale*, essentially irrelevant, at least as far as the audience is concerned. The canary choir also inverts the conventional hierarchy between “music” and “sounds of nature,” while at the same time undermining the prerogative of nature to produce these sounds and according artifice a prominent and acceptable role in their production instead. The popular appeal of canary recordings demonstrates that this inversion and inter-penetration of nature and artifice were not the exclusive realm of fiction, as in Andersen’s tale. Such recordings relied on the interplay of music played and composed by humans, inborn-but-bred propensities and trained repertoires of birds, and the world of recording and reproduction technology (not to mention the commercial, legal, and cultural underpinnings tying them together). To borrow Andrew Flack’s terms, such performances, live and recorded, illustrate “the hybridization of animal-human-machine” (40). They also create and occupy what Günter Figal calls a “phenomenal space,” as every artwork “not only grants a space, but is itself spatial” (214). Here, it does not matter whether the various performers are *co-present*, nor whether the audience is physically within earshot. Questions of origin, moreover — whether birds are part of *nature*, and human music and technology are part of *culture* — become impossible to answer in this new kind of musical space.

One further development of human-animal interactions mediated by technology in this way is highlighted in Michael Guida’s recent work on birdsong in interwar Britain. Guida’s

focus is not only on the preeminent role of technology — in this case prewar and wartime radio broadcasts of birdsong and its role in maintaining civilian morale — but also the ways in which animals and humans influence each other. A prime example of this was a nightingale that spontaneously accompanied the cellist Beatrice Harrison in her London garden, and whose performance was subsequently broadcast live to a charmed nation. In Guida's formulation, such a partnership, allied to and dependent upon technological innovation, attests to a cross-species contagion of emotion or affect. Against the backdrop of these case studies, it is hard to argue for even the emotional aspect of musical appreciation as a property possessed exclusively by the human animal. Most importantly, Guida's work reinforces and supports a view of the inadequacy of attempts to isolate "natural" birdsong from purely-human "music." Beyond a nature/culture divide, it is not even possible to sequester musicality from either biology or technology.

As alluded to above, the advent of sonic recording technologies altered the process of training caged birds such as canaries. To train young chicks turn-of-the-century fanciers had long used bird organs, serinettes, and exposure to live birds, captive or wild, of the same species or others. Progress in recording technologies and loudspeakers greatly simplified the training routine, providing both opportunities to reduce the cost and to enhance the capabilities of mass-produced birds, for the most part canaries. The Odenwald Bird Company, which took German canaries from the Harz region to the USA, developed, for instance, "a thoroughly mechanized operation with thousands of birdcages designed for easy cleaning and a system of loudspeakers used to train the birds to sing" (Smith 69). The owners of the company, the Stern brothers, also funded a radio show entitled *Hartz Radio Canaries* to advertise their birds and to offer "on-line

education” to distant canaries (Hartz Group History). The same brothers, having emigrated to the United States in 1926, set up as producers of pet food for canaries and other animals, and organized a radio show, the *American Radio Warblers*, on which canaries sang along to popular melodies (Smith 69-70). These broadcasts were positioned as training sessions for distant canaries, although human listeners who were not canary keepers were also invited to join. Evidently, then, recording technologies played a critical role both in the mass-production of trained canaries, as well as the distance learning of canaries in their keepers’ homes. Underscoring this use, Jacob Smith cites a 1937 article from the *Chicago Daily Tribune*, in which the author explains to canary keepers how best to situate their feathered pets near the radio to enhance their musical education (70). These “free lessons,” as they were called by the article’s author, could be supplemented with the use of phonograph records, which canary keepers were advised to also play to their birds a couple of times a day.

These changes in training technologies significantly influenced the song of the canary. Their influence supports Leach’s argument that the invention of sound recording represents *the* great revolution in musical culture — for birds and their songs and human performers and audiences alike. Canary songs became more standardized, and less like the ones sung by wild or untrained birds, but no less popular for that reason. Distinct “schools” or styles could be intentionally developed with greater precision. Some cruder forms, supported by mechanical musical instruments, declined in popularity. The German rollers, who sang with a “soft-voiced, sweet song,” having been taught with the use of the serinette or bird organ, were displaced in the US market by the domestically bred “American chopper who trills loud and long,” tutored by radio programs and

recordings (Nicholson 134). The new name was itself a new brand, suited to a nationalistic era, and further illustrates the geographical de-coupling of breeding and training. The variety of canary bred by the Odenwald Bird Company was now hatched in places like New Jersey, delivered for sale in the stores such as John Wanamaker in New York, and trained to sing a standardized repertoire in their keepers' homes (Hartz Group History; Nicholson 132). The great popularity and appeal of these singing canaries now depended upon an extended network connecting them via human-made technologies to an elaborately orchestrated training repertoire of tunes. In the age of mechanical reproduction, human or nonhuman authorship was no longer distinguishable, again precisely as Stravinsky seems to suggest.

5. Conclusions

In an echo of Kant, Elizabeth Leach summarizes the debate about the musicality of birdsong: "To acknowledge birdsong as music ... is to concentrate on the sound that is produced, from the perspective of the listener. Music is that which sounds like — that is, is heard as — music. Denying birdsong the status of music, conversely, attests to a focus on production and knowledge of the nature of the producing agent" (274). Taking this same choice for granted, a generation of music scholars in the 1950s and 60s insisted that "the music itself" is the central object of aesthetic experience, rather than its social or cultural context. But as the history of the singing canary, primarily in Germany and Russia, and later the United States, demonstrates, such a choice is far from inevitable. Initially, art and artifice of the human kind may have been hidden from view *vis-à-vis* aficionados of the canary's song. With the advent of decentralized domestic training, at some stage involving the widespread aid of recording technology, even the most

philosophically inclined canary keeper could not but acknowledge the prominence of human manipulations in the production of the canary's song. And yet, as the existence of a mass market for trained canaries and recordings of their songs indicates, this awareness of human-nonhuman cooperation at the nexus of nature, science, and technology did not detract from a wide-spread appreciation of the music so produced.

The story of the domestic canary demonstrates the aesthetic continuities among human and nonhuman animals and machines and the close and creative relationship among these elements or agents. Having looked at the past, we cannot endorse the invocation of the pure, nonhuman soundscape of paradise as a path to what Mundy calls "Edenic futures" (*Animal Musicalities* 167). Instead, the history of birdsong as a human-avian artifact indicates both the vintage and elusiveness of this idea, as well as the redeeming substance of its inverse. Our musical appreciation has been significantly bound up with animal natures, and this hybridization is essential to both the past and future development of aesthetic culture. A closer look at the performances of caged birds, even the humble canary, suggests in fact that "animal acts of all kinds are changing us, are changing our times, and will change the future of our species" (Chaudhuri and Hughes 2). Looking at, and listening to, the canary is especially salutary because its labile song says so much about our own non-exclusive musicality, as well as the bird's cultural evolution.

The popularity of the bred and trained canary as a source of musical entertainment is no longer what it once was. The career of the canary appears to register a distinct fall from grace, while the avian references of our own great composers, including Mozart, Stravinsky, Bartók, Messiaen, The Beatles, and others, enjoy sustained popularity. Perhaps it was recording technology — initially an aid to training, but later an alternative

to the trainee — which rendered the canary ultimately inferior to other forms of passive domestic musical entertainment. If so, the passing of the fad would offer further indication that the strange partnership between canary and keeper was motivated on the human side by an appreciation for the resulting musical performance. It also demonstrates that the cultural co-evolution of species, just like its biological pendant, is but a joint promenade for a while in the jungle of time, not a permanent symbiosis.

Works Cited

Abert, Hermann. *W.A. Mozart*. Yale UP, 2016.

Albright, Daniel. *Stravinsky: The Music Box and the Nightingale*. Gordon and Breach, 1988.

Araya-Salas, Marcelo. "Is Birdsong Music? Evaluating Harmonic Intervals in Songs of a Neotropical Songbird." *Animal Behavior* 84.2 (2012): 309-313.

Baptista, Luis F. and Sandra L.L. Gaunt. "Advances in Studies of Avian Sound Communication." *The Condor* 96.3 (1994): 817-830.

Bertau, Peter. *Die Bedeutung historischer Vogelnamen-Nichtsingvögel*. Springer-Verlag, 2014.

Birkhead, Tim. *The Red Canary: The Story of the First Genetically Engineered Animal*. Bloomsbury, 2014.

Birkhead, T.R. and S. van Balen. "Bird-Keeping and the Development of Ornithological Science." *Archives of Natural History* 35.2 (2008): 281-305.

Boswall, Jeffery, and Dominic Couzens. "Fifty years of bird sound publication." *American Birds* 36.6 (1982): 924-943.

Brashnin, I. L. "5-î konkurs peniãa kanareek na vystavke Imperatorskogo Rossiïskogo Obshchestva Ptsetsevodstva 12 noiãbrãa 1911 goda (v sem' chasov vechera)", in Goncharov, V. P. *Gollandskaïa Kanareïka c Prilozheniem svedeniï o konkursakh peniãa Kanareek Komissii Pevcheï Ptitsy Imperatorskogo Rossiïskogo Obchshestva Sel'sko-Khozïaïstvennogo Pritsevodstva*. Museï Ptistevodstva, 1911. 25-27.

Bregman, M.R., Patel, A.D., & Gentner, T.Q. "Songbirds use Spectral Shape, not Pitch, for Sound Pattern Recognition." *Proceedings of the National Academy of Sciences* 113.6 (2016): 1666-1671.

Breittruck, Julia. "Pet Birds, Cages and Practices of Domestication in Eighteenth-Century Paris." *InterDiscipines* 1 (2012): 6-24.

Bruyninckx, J. (2012). "Sound sterile: making scientific field recordings in ornithology." *The Oxford Handbook of Sound Studies* T. Pinch and K. Bijsterveld, eds. Oxford UP, 2012. 127-50.

Chaudhuri, Una, and Holly Hughes, eds. *Animal Acts: Performing Species Today*. U Michigan P, 2014.

Coperland, Peter, Jeffery Boswall, and Leonards Petts. *Birdsong on Old Records*. British Library of Wildlife Sounds, 1988.

Darwin, Charles. *The Expression of the Emotions in Man and Animals*. Harper Perennial, 2009.

Fedorov, N. "O Razmnozhenii Kanareek." *Vestnik Ptitsedovstva* 5 - 6 May and June (1891): 363-65.

Figal, Günter. *Aesthetics as Phenomenology: The Appearance of Things*. Indiana UP, 2015.

Flack, Andrew J.P. "Lions Loose on a Gentleman's Lawn: Animality, Authenticity and Automobility in the Emergence of the English Safari Park." *Journal of Historical Geography* 54 (2016): 38-49.

Guida, Michael. "Surviving Twentieth-Century Modernity: Birdsong and Emotions in Britain." *The Routledge Companion to Animal-Human History*. Hilda Kean and Philip Howell, eds. Routledge, 2018. 367-389.

Gutierrez, H.W. *The Roller Canary*, 5th Edition. Poultry World Limited, 1920.

Haraway, Donna. *When Species Meet*. U Minnesota P, 2013.

Harley, Maria Anna. "Natura Naturans, Natura Naturata and Bartók's Nature Music Idiom." *Studia Musicologica Academiae Scientiarum Hungaricae* 36.3/4 (1995): 329-349.

"The Hartz Group History." Accessed January 16, 2020. Online.

Hervieux de Chanteloup, Jean-Claude. *A New Treatise of Canary-Birds*. Bernard Lintot, 1718.

Haupt, Lyanda Lynn. *Mozart's Starling*. Corsair, 2017.

Hawkins, John. *A General History of the Science and Practice of Music*. T. Payne, 1776.

Head, Matthew. "Birdsong and the Origins of Music." *Journal of the Royal Musical Association* 122.1 (1997): 1-23.

Hegel, G.W.F. *Aesthetics: Lectures on Fine Art*, Volume I, trans. T.M. Knox. Oxford UP, 1975.

_____. *Philosophy of Nature, Part Two of the Encyclopedia of the Philosophical Sciences*. 1830. Trans. A.V. Miller. Oxford UP, 2007.

Higgins, Kathleen Marie. *The Music Between Us: Is Music a Universal Language?* U Chicago P, 2012.

Jarvis, Erich D. "Brains and Birdsong." *Nature's Music: The Science of Birdsong*. Peter Marler and Hans Slabbekoorn, eds. Elsevier, 2004, 226-271.

Kant, Immanuel. *Critique of Judgement*. Nicholas Walker, ed. Trans. James Creed Meredith. Oxford UP, 2008.

Kendall, Edward Augustus. *The Canary-Bird, A Moral Fiction. Interspersed with Poetry*. E. Newbery, 1799.

Kuhl, Patricia K. "Human Speech and Birdsong: Communication and the Social Brain." *PNAS* 100.17 (2003): 9645-9646.

Kulagin, N. "S'ezd Russkikh Ptitsevodov. Zasedanie 25-Ogo Marta 1892 Goda." *Vestnik Ptitsedovstva* 10.October (1892): 374-78.

Launer, K. and Grosse, R. (red Skvortsov, V.). *Osnovy Razvedeniâ I Obucheniâ Kanareek Peniû*. St. Petersburg: Tip. Shtaba Voïsk Peter. Voen. Okrug, 1913.

Leach, Elizabeth Eva. *Sung Birds: Music, Nature, and Poetry in the Later Middle Ages*. Cornell UP, 2007.

Levitin, Daniel. *This Is Your Brain on Music: Understanding a Human Obsession*. Atlantic, 2006.

Mansfield, Orlando A. "The Cuckoo and Nightingale in Music." *The Musical Quarterly* 7.2 (1921): 261-277.

Markova, Mariîa. *Kanareïka v Nevole. Rukovodstvo k Soderzhaniïu, Prirucheniïu, Razvedeniïu i Lecheniïu*. St. Petersburg: Tip. Muchnika, 1889.

Marler, Peter, and Hans Slabbekoorn. *Nature's Music: The Science of Birdsong*. Elsevier, 2004.

Mitîurnikov, I.P. "Dobroe Slovo K Russkim Kanarovodam." *Vestnik Ptitsedovstva* 5-6 May and April (1894): 170-176.

_____. "S'ezd Russkikh Ptitsevodov. Zasedanie 23-Ogo Marta 1892 Goda." *Vestnik Ptitsedovstva* 9 September (1892): 347-358.

Mundy, Rachel. *Animal Musicalities: Birds, Beasts, and Evolutionary Listening*. Wesleyan UP, 2018.

_____. "Birdsong and the Image of Evolution." *Society and Animals* 17 (2009): 206-223.

Mynott, Jeremy. *Birdscapes: Birds in Our Imagination and Experience*. Princeton UP, 2009.

Nevskiî, Nikolaî. *Rukovodstvo k Soderzhaniïu i Razdedeneïu Kanareek*. Moscow: Tip Bulgakova, 1898.

Nicholson, Arnold. "Songbird Assembly Line." *Saturday Evening Post* 5 December, 1947.

Nottebohm, F. "Why are Some Neurons Replaced in Adult Brain?" *Journal of Neuroscience* 22.3 (2003): 624-628.

Okanoya, Kazuo. "Birdsong for Biolinguistics." *The Cambridge Handbook in Biolinguistics*. Cedric Boeckx and Kleantes K. Grohmann, eds. Cambridge UP, 2018, 431-459.

Oerlemans, Onno. "Sing and Be Heard: Birdsong and the Romantic Lyric." *Mosaic: An Interdisciplinary Critical Journal* 51.2 (2018): 1-16.

Pervye Kanareiki [Literature for Children], *Izdavie Zhurnala Mal'utka*. Moscow, 1890.

Petri, O. "Song of the *Ovsianka*: Enhanced Nature of the Urban Canary in Imperial St. Petersburg (1880-1900)." *Society & Animals* (2019): 1-25.

Randel, Fred V. "Coleridge and the Contentiousness of Romantic Nightingales." *Studies in Romanticism* 21.1 (1982): 33-55.

Rottner, Regina. "Are 'Non-Human Sounds/Music' Lesser than Human Music? A Comparison from a Biological and Musicological Perspective." *Sign System Studies* 37. 3/4 (2009): 509-524.

Robbins, Louise E. *Elephant Slaves and Pampered Parrots: Exotic Animals in Eighteenth-Century Paris*. Johns Hopkins UP, 2002.

Rothenberg, David. *Nightingales in Berlin: Searching for the Perfect Sound*. Chicago UP, 2019.

_____. *Why Birds Sing: A Journey into the Mystery of Bird Song*. Basic Books, 2005.

Rothfels, N. "How the Caged Bird Sings: Animals and Entertainment." *The Cultural History of Animals in the Age of Empire*. K. Kete, ed. Berg, 2007. 95-112.

Russ, K. *Kanareïka. Eïa Estestvennaïa Istorïa*, St. Petersburg: Tip. Stasiulevicha, 1899.

Savenkov, P. A. (1909). "Konkurs kanareek na vystavke Imperatorskogo Rossiïskogo Obshchestva S.-KH. Ptsetsevodstva v Moskve 11 - 15 noiabrïa 1909 goda" in Goncharov, V.P. *Gollandskaïa Kanareïka c Prilozheniem svedeniï o konkursakh peniïa Kanareek Komissii Pevcheï Ptitsy Imperatorskogo Rossiïskogo Obshchestva Sel'sko-Khoziïstvennogo Pritsevodstva*. Moscow: Museï Ptistevodstva, 1909. 21-22.

Shanin, K.I. *Kanareïka. Razvedenie, Ukhod, Obuchenie Peniïu I Lechenie Boleznej*. Izdatel'stvo knigotorgovtsa Brillïantova, 1898.

Shell, Marc. "Animals that Talk; or, Stutter." *Differences: A Journal of Feminist Cultural Studies* 15.1 (2004): 84-107.

Smith, Jacob. *Eco-Sonic Media*. U California P, 2015.

Specter, Michael. "Rethinking the Brain: How the Songs of Canaries Upset the Fundamental Principle of Science." *New Yorker* 23 July 2001: 42-53.

Stap, Don. *Birdsong: A Natural History*. Oxford UP, 2005.

Stresemann, E. "Beiträge zu einer Geschichte der deutschen Vogelkunde." *Journal für Ornithologie* 73.4 (1925): 594-628.

Tait, Peta. *Wild and Dangerous Performances: Animals, Emotions, Circus*. Palgrave Macmillan, 2012.

Taylor, Hollis. *Is Birdsong Music? Outback Encounters with an Australian Songbird*. Indiana UP, 2017.

Taylor, Hollis, and Dominique Lestel. "The Australian pied butcherbird and the natureculture continuum." *Journal of Interdisciplinary Music Studies* 5.1 (2011): 57-83

Tipp, Cheryl. "The Birth of Wildlife Recording. Part II, Recording in the Wild." *Sonic Field*. Accessed 17 January 2020.

Vladimirskiî, A. "Sovremennoe Polozhenie Kanarechnogo Promysla V Kaluzhskoî Gubernii (Putevye Zametki)." *Vestnik Ptitsedovstva* 11 (1893): 612-615.

Watkins, Holly. *Musical Vitalities: Ventures in a Biotic Aesthetics of Music*. Chicago UP, 2018.

_____. "On Not Letting Sounds Be Themselves." *The New Centennial Review* 18.2 (2018): 75-98.

West, Meredith J., and Andrew P. King. "Mozart's starling." *American Scientist* 78.2 (1990): 106-114.

Whatmore, Sarah. *Hybrid Geographies: Natures Cultures Spaces*. Sage, 2002.

Witchell, Charles. *The Evolution of Bird-Song*. Adam and Charles Black, 1896.

Zeigler, H. Philip, and Peter Marler, eds. *The Neuroscience of Birdsong*. Cambridge UP, 2008.

Zoologicheskiĭ Magazin 'Akvarium.' *Kratkoe Nastavlenie o Soderzhanii i Ukhode za Komnatnymi Pevchimi Ptitsami i Lechenii Ikh Boleznej*. St. Petersburg: Tip. T-va Ekaterinenskoe Pечатnoe Delo, 1909.

Zon, Bennett. *Evolution and Victorian Musical Culture*. Cambridge UP, 2017.