

Episode One: Station

Xeno-Canto recordings:

Eurasian Skylark, <https://www.xeno-canto.org/489827>.

Song Sparrow, <https://www.xeno-canto.org/480068>.

Brown Thrasher, <https://www.xeno-canto.org/269473>.

Barn Swallow, <https://www.xeno-canto.org/379571>.

Cassin's Kingbird, <https://www.xeno-canto.org/34654>.

Wood Thrush, <https://www.xeno-canto.org/178123>.

Baltimore Oriole, <https://www.xeno-canto.org/134872>.

Eastern Phoebe, <https://www.xeno-canto.org/178126>.

Black Kite, <https://www.xeno-canto.org/428617>.

European Pied Flycatcher, <https://www.xeno-canto.org/475982>.

Prairie Warbler <https://www.xeno-canto.org/464186>.

Bibliography:

Khlebnikov, Velimir. "The Radio of the Future" (1921). In *Collected Works of Velimir Khlebnikov, Volume 1*, edited by Charlotte Douglas. Cambridge, MA: Harvard University Press, 1987.

Gallico, Paul. *The Snow Goose*. London: Penguin Books, (1941) 1967.

Le Guin, Ursula K. "The Carrier Bag Theory of Fiction." In *The Ecocriticism Reader*, edited by Cheryll Glotfelty and Harold Fromm. Athens: University of Georgia Press, 1996.

On "sky media":

Peters, John Durham. *The Marvelous Clouds*. Chicago: University of Chicago Press, 2015.

Early newspaper accounts of radio:

“Messages in the Air.” *Washington Post*, July 3, 1898, 23.

“Out of the Clouds.” *Los Angeles Times*, October 31, 1899, 5.

On the aerosphere:

Chilson, Phillip B., Winifred F. Frick, Jeffrey F. Kelly, Felix Liechti, eds. *Aeroecology*, Cham, Switzerland: Springer, 2017.

Diel, Robert H. “The Airspace is Habitat.” *Trends in Ecology & Evolution* 28, no. 7 (July 2013).

Kunz, Thomas H., Sidney A. Gauthreaux Jr., Nickolay I. Hristov, Jason W. Horn, Gareth Jones, Elisabeth K. V. Kalko, Ronald P. Larkin, Gary F. McCracken, Sharon M. Swartz, et al.

“Aeroecology: Probing and Modeling the Aerosphere.” *Integrative and Comparative Biology* 48, no. 1 (2008).

On nonhuman lifeways:

Lorimer, Jamie. *Wildlife in the Anthropocene*. Minneapolis: University of Minnesota Press, 2015.

Tsing, Anna, Heather Swanson, Elaine Gan, Nils Burbandt, eds. *Arts of Living on a Damaged Planet*. Minneapolis: University of Minnesota Press, 2017.

Van Dooren, Thom. *Flight Ways*. New York: Columbia University Press, 2014.

On radio as an assemblage:

Bennett, Jane. *Vibrant Matter: A Political Ecology of Things*. Durham, NC: Duke University Press, 2010.

Jagoda, Patrick. *Network Aesthetics*. Chicago: University of Chicago Press, 2016.

Latour, Bruno. *Reassembling the Social*. Oxford: Oxford University Press, 2005.

Slack, Jennifer Daryl, and J. Macgregor Wise. *Culture and Technology*. New York: Peter Lang, 2007.

On bird migration:

Able, Kenneth P., ed. *Gatherings of Angels: Migrating Birds and Their Ecology*. Ithaca, NY: Comstock Books, 1999.

Birkhead, Tim, Jo Wimpenny, and Bob Montgomerie. *Ten Thousand Birds: Ornithology since Darwin*. Princeton: Princeton University Press, 2014.

Buckeridge, John. "Of Trees, Geese, and Cirripedes: Man's Quest for Understanding." *Integrative Zoology* 6 (2011).

Elphick, Jonathan. *Atlas of Bird Migration*. Buffalo, NY: Firefly Books, 2011.

Gauthreaux, Sidney A. "Bird Migration: Methodologies and Major Research Trajectories (1945–1995)." *The Condor* 98, no. 2 (May 1996).

Kerlinger, Paul. *How Birds Migrate*. 2nd ed. Mechanicsburg, PA: Stackpole Books, 2009.

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Vaughn, Richard. *Wings and Rings: A History of Bird Migration Studies in Europe*. Penryn, UK: Isabelline Books, 2009.

Weidensaul, Scott. *Living on the Wind: Across the Hemisphere with Migratory Birds*. New York: North Point Press, 1999.

Example of birds as logistical media:

Burroughs, John. *The Birds of John Burroughs*. Woodstock, NY: Overlook Press, 1988.

Examples of environmental media studies:

Mattern, Shannon. *Code and Clay, Data and Dirt*. Minneapolis: University of Minnesota Press, 2017.

Parikka, Jussi. *A Geology of Media*. Minneapolis: University of Minnesota, 2015.

On aluminum:

Evenden, Matthew. "Aluminum, Commodity Chains, and the Environmental History of the Second World War." *Environmental History* 16 (January 2011).

Sheller, Mimi. *Aluminum Dreams: The Making of Light Modernity*. Cambridge, MA: MIT Press, 2014.

On bird population decline:

Rosenberg, Kenneth V., Adriaan M. Dokter, Peter J. Blancher, John R. Sauer, Adam C. Smith, Paul A. Smith, Jessica C. Stanton, Arvind Panjabi, Laura Helft, Michael Parr, and Peter P. Marra. "Decline of the North American Avifauna." *Science* 366 (October 2019): 120–24.

On bird banding:

"Bird Banding." Wildlife Leaflet 373, January. Washington, DC: United States Department of the Interior, Fish and Wildlife Service, 1956.

Fisk, Erma J. *The Bird with the Silver Bracelet*. New York: Coalition of Publishers for Employment, 1986.

Gardner, Alfred L. “The United States Biological Survey: A Brief History 1885–1940.” In *United States Biological Survey: A Compendium of Its History, Personalities, Impacts, and Conflicts*, edited by David J. Schmidly, William E. Tydeman, and Alfred L. Gardner. Special Publications no. 64. Lubbock: Museum of Texas Tech University, 2016.

Lincoln, Frederick C. “The History and Purposes of Bird Banding,” *The Auk* 38 (1921): 220.

Lincoln, Frederick C. *Instructions for Bird Banding*. Department Circular 170. Washington, DC: United State Department of Agriculture, April 1921.

Lincoln, Frederick C., and S. Prentiss Baldwin. *Manual for Bird Banders*. Miscellaneous Publication No. 58. Washington, DC: United States Department of Agriculture, November 1929.

On Hans Christian Mortensen:

Preuss, Niels Otto. “Hans Christian Cornelius Mortensen: Aspects of His Life and of the History of Bird Ringing.” *Ardea* 89, no. 1.

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Weidensaul, Scott. *Living on the Wind: Across the Hemisphere with Migratory Birds*. New York: North Point Press, 1999.

On early radio culture:

Douglas, Susan. *Inventing American Broadcasting, 1899–1922*. Baltimore: Johns Hopkins University Press, 1987.

Douglas, Susan. *Listening In*. Minneapolis: University of Minnesota Press, 2004.

Haring, Kristen. *Ham Radio's Technical Culture*. Cambridge, MA: MIT Press, 2008.

On mobile privatization:

Williams, Raymond. *Television*. New York: Routledge Classics, 2003.

On singing kites:

Chadwick, Nora. "The Kite: A Study in Polynesian Tradition." *Journal of the Royal Anthropological Institute of Great Britain and Ireland* 61 (July–December 1931).

Clark, Mitchell. "Aeolian-Bow Kites in China." *Experimental Musical Instruments* (March 1999).

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McKinney, Linda. "Singing Kites of Cambodia." In *Art of the Refugee Experience*, edited by Jan Rindfleisch. Cupertino, CA: De Anza College, 1988.

Wang, Hongxun. *Chinese Kites*. Beijing: Foreign Language Press, 1989.

On mismatch:

Both, Christiaan, Chris A. M. Van Turnhout, Rob G. Bijlsma, Henk Sipel, Arco J. Van Strien, and Ruud P. B. Foppen. "Avian Population Consequences of Climate Change Are Most Severe for Long-Distance Migrants in Seasonal Habitats." *Proceedings of the Royal Society B* 277 (2010).

Gordo, Oscar. “Why Are Bird Migration Dates Shifting? A Review of Weather and Climate Effects on Avian Migratory Phenology.” *Climate Research* 35 (December 2007).

Jones, Tim, and Will Cresswell. “The Phenology Mismatch Hypothesis: Are Declines of Migrant Birds Linked to Uneven Global Climate Change?” *Journal of Animal Ecology* 79 (2010): 98.

Strode, Paul K. “Implications of Climate Change for North American Wood Warblers (Parulidae).” *Global Change Biology* 9 (2003).

Visser, Marcel E., and Christiaan Both. “Shifts in Phenology Due to Global Climate Change: The Need for a Yardstick.” *Proceedings of the Royal Society B* 272 (2005).

Audio clips in this episode:

Lavinia de Sousa Mendes’s song for World Migratory Bird Day 2018,
<https://www.youtube.com/watch?v=nQKmViLDydc>.

Excerpt from Detroit Emeralds, “Wear This Ring (with love)” (1971).

Excerpt of singing kite, from <http://www.windmusik.com>.

Excerpt of pigeon whistles, from Peter Cusack’s “Favorite Beijing Sounds”:
<https://subjamlab.bandcamp.com/album/favourite-beijing-sounds>.

Excerpts from “The Snow Goose” (Decca Records, 1948), “The Snow Goose” BBC Television production, 1971.

Episode Two: Tower

Xeno-Canto recordings:

Eurasian Curlew, <https://www.xeno-canto.org/236884>.

Eurasian Curlew, <https://www.xeno-canto.org/200083>.

Eurasian Curlew, <https://www.xeno-canto.org/246274>.

Common Redshank, <https://www.xeno-canto.org/199077>.

Eurasian Wigeon, <https://www.xeno-canto.org/213270>.

Scarlet Tanager, <https://www.xeno-canto.org/144033>.

Common Yellowthroat, <https://www.xeno-canto.org/416167>.

Brown Creeper, <https://www.xeno-canto.org/188782>.

Yellow Rail, <https://www.xeno-canto.org/153049>.

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Peters, John Durham. *The Marvelous Clouds*. Chicago: University of Chicago Press, 2015.

On lighthouses:

Naish, John. *Seamarks: Their History and Development*. London: Stanford Maritime, 1985.

Schiffer, Michael Brian. "The Electric Lighthouse in the Nineteenth Century." *Technology and Culture* 46, no. 2 (April 2005).

On Peter Scott:

Gallico, Paul. Introduction to *Three Legends*. New York: Doubleday, 1966.

Kear, Janet. "Sir Peter Scott." *Ibis* 132 (1989).

Early accounts of towerkill at lighthouses:

Ducey, James E. "Destruction of Birds from Striking Light-houses Prevalent in the 1800s." Wildbirds Broadcasting, February 7, 2009, <http://wildbirdsbroadcasting.blogspot.com/2009/02/destruction-of-birds-from-striking.html>

Thoreau, Henry David. *Cape Cod*. New York: Penguin, 1987.

On undersea cables:

Starosielski, Nicole. *The Undersea Network*. Durham, NC: Duke University Press, 2015.

On lighthouses as sites of biological research:

"The Birds and the Light-Houses." *Friends' Review*, December 15, 1887, Vol. 41, No. 20, p. 316.

Bonhote, J. Lewis. "Bird Migration at Some of the Bahama Lighthouses." *The Auk* 20, no. 2 (April 1903): 169.

"Circular on the Geographical Distribution and Migration of North—American Birds for 1887." Circular no. 8. Washington, DC: U.S. Department of Agriculture, February 23, 1887.

"Circular to the Keepers of Lights." Circular no. 24. Washington, DC: U.S. Department of Agriculture, December 31, 1909.

"Protecting Birds at Lighthouses." *Forest and Stream*, December 5, 1914.

On tower music:

Collins, Timothy A. "Of the Differences between Trumpeters and City Tower Musicians: The Relationship of Stadtpfeifer and Kammeradschaft Trumpeters." *Galpin Society Journal* 53 (April 2000): 51–59.

Lee, William R. "Wind Music of the Baroque." *Journal of Band Research* 20, no. 1 (Fall 1984): 2.

On telegraph wires as "murderous network":

Coues, Elliott. "The Destruction of Birds by Telegraph Wires." *American Naturalist* 10, no. 12 (December 1876).

On early radio infrastructure:

Mattern, Shannon. *Code and Clay, Data and Dirt*. Minneapolis: University of Minnesota Press, 2017.

On signal territories and node-centric research:

Parks, Lisa. "Earth Observation and Signal Territories: US Broadcast Infrastructure, Historical Network Maps, Google Earth, and Fieldwork." In *Ecomedia: Key Issues*, edited by Stephen Rust, Salma Monani, and Sean Cubitt. London: Routledge, 2016.

Tower ads containing references to the "profitable direct is up," and a "new American skyline":

Advertisement, *Broadcasting*, June 30, 1941, 33.

Advertisement, *Broadcasting*, September 12, 1955, 65.

On aluminum and architecture:

"Aluminum Panels Chosen for Radio City Buildings." *New York Herald Tribune*, January 16, 1932, 28.

"Aluminum Spandrels Ordered for Radio City." *New York Times*, January 16, 1932, 17.

Nichols, Sarah. "Aluminum by Design: Jewelry to Jets." In *Aluminum by Design*, edited by Sarah Nichols. Pittsburgh: Carnegie Museum of Art, 2000.

On FCC and lighting:

"Attire of Orange and White Ordered for Radio Antennae." *Washington Post*, September 14, 1937, 11.

"Uniform Antenna Marks Are Sought by the FCC in Revised Regulations." *Broadcasting*, September 1, 1937, 68.

Towerkill studies at communication towers:

Brewer, Richard, and Jack A. Ellis. "An Analysis of Migrating Birds Killed at a Television Tower in East-Central Illinois, September 1955–May 1957." *The Auk* 75 (October 1958).

Cochran, William, and Richard R. Graber. "Attraction of Nocturnal Migrants by Lights on a Television Tower." *Wilson Bulletin* 70, no. 4 (December 1958): 379–80.

Kemper, Charles. "Destruction at the TV Tower." *Passenger Pigeon* 20 (1958): 3.

Kemper, Charles. "More TV Tower Destruction." *Passenger Pigeon* 21 (1959).

Kemper, Charles. "A Study of Bird Mortality at a West Central Wisconsin TV Tower from 1957–1995." *Passenger Pigeon* 58, no. 3 (1996): 230–31.

Kemper, Charles. "A Tower for TV: 30,000 Dead Birds." *Audubon Magazine* 66 (1964): 88.

Seets, James W., and David H. Bohlen. "Comparative Mortality of Birds at Television Towers in Central Illinois." *Wilson Bulletin* 89, no. 3 (September 1977): 422.

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On towerkill:

Anderson, Paul K. “Wireless Telecommunications and Night Flying Birds: We May Be Sacrificing Millions of Migrants for Convenience, Entertainment, and Profit.” *Biodiversity* 4, no. 1 (2011).

Longcore, Travis, Catherine Rich, Pierre Mineau, Beau MacDonald, Daniel G. Bert, Lauren M. Sullivan, Erin Mutrie, Sidney A. Gauthreaux Jr., Michael L. Avery, Robert L. Crawford, et al. “An Estimate of Avian Mortality at Communication Towers in the United States and Canada.” *PLoS One* 7, no. 4 (April 2012): 13.

Manville, Albert M., II. “Strikes and Electrocutions at Power Lines, Communication Towers, and Wind Turbines: State of the Art and State of the Science—Next Steps Toward Mitigation.” Paper presented at the Third International Partners in Flight Conference, March 20–24, 2002, Asilomar Conference Grounds, Monterey, California. USDA Forest Service Gen. Tech. Rep. PSW-GTR-191 (2005), 1055-6.

Shire, Gavin G., Karen Brown, and Gerald Winegrad. “Communication Towers: A Deadly Hazard to Birds.” A report compiled by the American Bird Conservancy, June 2000.

2016 FAA advisory on lighting:

https://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.information/documentID/1030047

Audio clips in this episode:

Francisco Lopez, “untitled #300,” and “untitled #345.”

Tower music excerpts:

Johann Gottfried Reiche, “Sonatina aus Turmsonaten.”

Joachim Werzlau, “Tower Music” (1961).

Ludwig van Beethoven, “Drei Equale fur vier Posaunen.”

Vaclav Nelhybel, “Tower Music,” performed by the Chicago Trombone Consort.

Interview with William Cochran, October 20, 2018.

Interview with Joelle Gehring, August 26, 2019.

Interview with Annette Prince, January 10, 2019.

Chicago Bird Collision Monitors website:

<https://www.birdmonitors.net>

Excerpt of “The Snow Goose” from radio anthology series “Theatre Royale,” broadcast April 18, 1954.

Episode Three: Waves

Xeno-Canto recordings:

Painted Bunting, <https://www.xeno-canto.org/268261>.

Summer Tanager, <https://www.xeno-canto.org/323197>.

Magnolia Warbler, <https://www.xeno-canto.org/189305>.

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On radar as logistical media:

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On early radio beacons:

"Mariners' Beacons Date to Early Days." *New York Times*, January 15, 1928, 162.

"Sound and Radio Waves Now Race to Measure Accurately Deceptive Distances at Sea." *New York Herald Tribune*, April 3, 1927, G3.

Haskin, Frederic. "Radio Beacons Use Increases." *Los Angeles Times*, February 15, 1929, 9.

McCloud, Norman C. "Robbing Fog of Its Perils." *Popular Science*, March 1928, 47.

Putnam, George R. "How Our Lighthouses Use Radio." *Radio Broadcast*, November 1922–April 1923, 369.

On "flying the beam":

"Radio Beacon for Airplanes Is Perfected." *New York Herald*, December 20, 1925, A10.

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Hartcup, Guy. *The Effect of Science on the Second World War*. London: Palgrave Macmillan, 2000.

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Fox, Anthony D., and Patrick D. Beasley. "David Lack and the Birth of Radar Ornithology." *Archives of Natural History* 37, no. 2 (2010).

Lack, David. *Enjoying Ornithology*. London: Methuen and Co, 1965.

On radar angels:

Bus, Irven O. "Bird Detection by Radar." *The Auk* 63 (1946): 315.

Drury, W. H., et al., "The Migration of Angels." *Natural History* 70, no. 8 (October 1961): 11.

On haunted media:

Sconce, Jeffrey. *Haunted Media*. Durham, NC: Duke University Press, 2000.

On aluminum and the war effort:

Nichols, Sarah. "Aluminum by Design: Jewelry to Jets." In *Aluminum by Design*, edited by Sarah Nichols. Pittsburgh: Carnegie Museum of Art, 2000.

Sheller, Mimi. *Aluminum Dreams: The Making of Light Modernity*. Cambridge, MA: MIT Press, 2014.

On radar ornithology:

Bruderer, Bruno. "The Study of Bird Migration by Radar, Part 1: The Technical Basis." *Naturwissenschaften* 84, no. 1 (1997).

Eastwood, Eric. "Radar, Birds and Aircraft." *Electronics & Power* (April 1969).

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Flock, Warren L., and John L. Green. "The Detection and Identification of Birds in Flight, Using Coherent and Noncoherent Radars." *Proceedings of the IEEE* 62, no. 6 (June 1974).

Gauthreaux, Sidney, and Carroll G. Belser. "Radar Ornithology and Biological Conservation." *The Auk* 120, no. 2 (April 2003).

Graber, Richard R., and Sylvia Sue Hassler. "The Effectiveness of Aircraft-Type (Aps) Radar in Detecting Birds." *Wilson Bulletin* 74, no. 4 (October–December 1962).

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"Bird and Animal Wireless Code." *New York Herald*, December 6, 1925, A2.

"Birds and Insects Use Radio, Professor Asserts." *New York Herald Tribune*, March 4, 1928, G5.

"Wireless Affects Homing Birds." *Washington Post*, September 4, 1910, M4.

"Wireless Worries Birds." *Washington Post*, November 9, 1913, M1.

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On avian magnetic perception:

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Weidensaul, Scott. *Living on the Wind: Across the Hemisphere with Migratory Birds*. New York: North Point Press, 1999, 62–63.

Wiltschko, Roswitha, and Wolfgang Wiltschko. “Avian Navigation: From Historical to Modern Concepts.” *Animal Behavior* 65 (2003): 257.

Wiltschko, Roswitha, and Wolfgang Wiltschko. *Magnetic Orientation in Animals*. Berlin: Springer, 1995, 44–45.

Sidney Gauthreaux paper on decline in bird population:

Gauthreaux, Sidney A. “The Use of Weather Radar to Monitor Long-term Patterns of Trans-Gulf Migration in Spring.” In *Ecology and Conservation of Neotropical Migrant Landbirds*, edited by J. M. Hagan III and D. W. Johnston. Washington, DC: Smithsonian Institution Press, 1992, 96–100.

More sources on bird population:

Faaborg, John. *Saving Migrant Birds*. Austin: University of Texas Press, 2002.

Wilcove, David S. *No Way Home: The Decline of the World’s Great Animal Migrations*. Washington, DC: Island Press, 2008, 22.

Robinson, Scott K. “The Case of the Missing Songbirds.” *Consequences* 3, no. 1 (1997).
<http://www.gcario.org/CONSEQUENCES/vol3no1/songbirds.html>

Partners in Flight:

<https://partnersinflight.org>

Center for Biological Diversity:

<https://www.biologicaldiversity.org>

Audio clips in this episode:

Excerpt from Four Tet, “Angel Echoes” (2010).

Excerpts from “Wings of Angels,” BBC Television production (1999).

Excerpt from Woody Guthrie, “Grand Coulee Dam” (1941).

Interview with Sidney Gauthreaux, March 27, 2019.

Episode Four: Microphone

Xeno-Canto recordings:

Grey-cheeked Thrush, <https://www.xeno-canto.org/70116>.

Nashville Warbler, <https://www.xeno-canto.org/225283>.

Bicknell’s Thrush, <https://www.xeno-canto.org/467685>.

Golden-winged Warbler, <https://www.xeno-canto.org/107165>.

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On flight calls:

Farnsworth, Andrew. “Flight Calls and Their Value for Future Ornithological Studies and Conservation Research.” *The Auk* 122, no. 3 (July 2005).

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Winger, B. M., B. C. Weeks, A. Farnsworth, A. W. Jones, M. Hennen, and D. E. Willard. "Nocturnal Flight-Calling Behavior Predicts Vulnerability to Artificial Light in Migratory Birds." *Proceedings of the Royal Society B* 286, no. 1900 (2019).

"Shaker hymns" quote:

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On radio transcription discs:

"Federal Priority on Aluminum May Curtail Blanks for Discs." *Broadcasting*, March 3, 1941, 62.

"Radio Running Out of Aluminum for Disks." *New York Times*, May 28, 1941, 19.

Russo, Alexander. *Points on the Dial*. Durham, NC: Duke University Press, 2010.

On the Cornell Lab of Ornithology:

Bruyninckx, Joeri. *Listening in the Field*. Cambridge, MA: MIT Press, 2018.

Chu, Miyoko. *Songbird Journeys*. New York: Walker and Company, 2006.

Charif, Russell, Steve Mitchell, and Christopher W. Clark. *Canary 1.2 User's Manual*. Ithaca, NY: Cornell Laboratory of Ornithology, 1995.

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On recording and bird study:

Bruyninckx, Joeri. *Listening in the Field*. Cambridge, MA: MIT Press, 2018.

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Cochran and Graber's experiment:

Graber, Richard R., and William W. Cochran. "An Audio Technique for the Study of Nocturnal Migration of Birds." *Wilson Bulletin* 71 (1959).

Bill Evans's publications:

Evans, William R. "Nocturnal Flight Calls of Bicknell's Thrush." *Wilson Bulletin* 106, no. 1 (1994).

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On infrasound:

Bedard, Alfred J., and Thomas M. Georges. "Atmospheric Infrasound." *Physics Today* 53 (March 2000): 32–33.

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A study suggesting birds sense distant weather, and a critique of that study:

Streby, Henry M., Gunnar R. Kramer, Sean M. Peterson, Justin A. Lehman, David A. Buehler, and David E. Andersen. "Tornadoic Storm Avoidance Behavior in Breeding Songbirds." *Current Biology* 25, no. 1 (January 2015).

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Acknowledgments

Sally Ann McIntyre provided early inspiration and introduced me to Velimir Khlebnikov’s essay, thereby naming this endeavor. Thanks to colleagues at Northwestern for conversation and inspiration, in particular Olivia Block, Chris Mercer, and Stephan Moore. Thanks as well to students in the Sound Arts program and my “Media and the Environment” courses. Neil Verma lent a keen ear and offered helpful insights. Sarah Geis transformed the project through her feedback, and in the process greatly enhanced the way I listen to and work with audio. First Mary Francis, and then Sara Cohen, were wonderful stewards of the project through the production process at the University of Michigan. Liam Davis’s postproduction made it sound so much better. Thanks to my interviewees, who graciously provided their time and expertise: Antoine Bertin, William Cochran, Bill Evans, Andrew Farnsworth, Sidney Gauthreaux, Joelle Gehring, Jonathan Hagstrum, Charles Kemper, Annette Prince, and Martin Wikelski. I am grateful to all the folks who helped to facilitate the interviews, and for research assistance from Uli Wahl, Russ Charif, and Miyoko Chu. I am humbled to be able to include music by Dominik Eulberg and Four Tet; thanks to them and also to Matthias Weimer and Tom Deffee for their help. I’m honored as well to be able to use Benjamin Chee Chee’s beautiful image, “Swallows”: thanks to Guy Mattar for arranging the permission to use it, and to Natasha Petric at Canadian Art Prints for providing the digital image. Finally, thanks as always to my family for their love, support, and feedback: Freda, I can’t wait for our big year!