

ECOLOGY OF CENTER CITY, PHILADELPHIA



KENNETH D. FRANK

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PREFACE

During the latter half of the eighteenth century and the beginning of the nineteenth, Philadelphia established itself as the country's center for the study of natural history. The city's contribution to the natural sciences has been beautifully presented in two recent books: *A Glorious Enterprise*, by Robert McCracken Peck and Patricia Tyson Stroud;¹ and *Knowing Nature: Art and Science in Philadelphia, 1740–1840*, by Amy R. W. Meyers.²

This scientific industry produced a trove of historical records of Philadelphia's flora and fauna. For some species, the accounts are the first recorded observations and took place within city limits. The records exist not only in the form of publications but also in specimens in museums, especially the Academy of Natural Sciences of Drexel University (formerly the Academy of Natural Sciences of Philadelphia).³

Coexisting with this scientific legacy is a brick-and-mortar heritage. The streetscape of residential neighborhoods in downtown Philadelphia looks today much as it did in the nineteenth century. Municipal landmarks cited over a century ago in accounts of plants and animals remain in place. Environmental change has been recorded in historical photographic collections.⁴ Municipal records document the evolution of pollution of air and water in nineteenth-century industrial Philadelphia and the city's largely successful efforts at control.

This book examines the flora and fauna of the city's downtown district known as Center City. Each of the book's first twenty-seven chapters focuses on a different species, starting with earliest accounts I could find in the vicinity of Philadelphia. The book highlights additional species in one-page "spotlights." Most of the species are common here, but some are common just outside downtown, and others were once common but are now locally extinct. The chapters explore how they succeeded or failed to establish local populations. They look at pollution—light, sound, water, air, and thermal. A recurrent topic is the effect of prejudice, both positive and negative, on the fate of species downtown.

If this book has a unifying theme, it is the many ways people have shaped communities of plants and animals that inhabit downtown, and the ways these communities have defied human control and survived in spite of, or because of, dense urban development. The iconic landmarks included in many of my photographs convey this theme's immediacy. The ecology of Center City has been dynamic and resilient—qualities that I expect will endure.

One final reason for choosing downtown Philadelphia: My wife and I have lived here for almost four decades. What a pleasure it has been to observe natural history just beyond our front stoop. I hope this book will entice people living downtown in other cities to explore ecology close to home.

ACKNOWLEDGEMENTS

Many staff members and resources at the Academy of Natural Sciences of Drexel University contributed to this book:

David Hewitt, research associate in botany at the Academy, mentored me in urban botany and Center City's ecological history. Alfred Ernest Schuyler, curator emeritus in the Academy's Botany Department, provided a list of Center City trees classified according to whether they were present before European settlement. Alina Freire-Fierro, collection manager of the Academy's Botany Department, retrieved from the Academy's herbarium nineteenth-century specimens of mugwort collected on ballast dumps near the port of Philadelphia. Tatyana Livshultz, assistant professor in the Department of Biodiversity, Earth and Environmental Science of Drexel University, introduced me to her basic research on the evolutionary biology of milkweeds. Jason D. Weintraub, lepidopterist and entomological collection manager at the Academy, showed me the historic *Cynthia* moths in the Academy's collections, and included me on an expedition searching for the *Cynthia* moth in Philadelphia. He also collaborated with me in photographing the polyphemus moths in the historic Titian Ramsay Peale Butterfly and Moth Collection, which he curated. Greg Cowper, in the Entomology Department, retrieved for my examination the Academy's historic Chinese mantids, collected around the time of the species' initial North American introduction in Philadelphia. Jon K. Gelhaus, professor in the Department of Biodiversity, Earth and Environmental Science of Drexel University and curator in the Entomology Department at the Academy, called my attention to the colony of sand wasps (stink bug hunters) nesting in Logan Circle, across the street from the Academy. Richard J. Horwitz, professor in the Department of Biodiversity, Earth and Environmental Sciences of Drexel University and fisheries section leader in the Academy's Patrick Center for Environmental Research, identified the bryozoan I found, *Cristatella (Pectinatella) magnifica*. Nathan H. Rice, ornithology collection manager at the Academy, identified the northern parula I found dead on a sidewalk after a storm. Cathy Buckwalter, reference librarian at the Academy, and Jennifer Vess, the Academy's Brooke Dolan Archivist, retrieved from the library's archives Thomas Say's copy of Frederick Valentine Melsheimer's *A Catalogue of Insects of Pennsylvania*. Robert McCracken Peck, senior fellow of the Academy, provided helpful consultation about publication of this book.

People and resources in other institutions in Philadelphia made important contributions:

Joel T. Fry, curator at Bartram's Garden, called my attention to many of John Bartram's observations, especially his written description of the black and yellow mud dauber. Susan Glassman, director of The Wagner Free Institute of Science of Philadelphia, and Lynn Dorwaldt, librarian at the Wagner, made available for my inspection artifacts and documentation from the excavation of the Subway Tree, on display at the Institute. Joseph A. Perillo aquatic biologist for the Philadelphia Water Department, told me about his observations confirming establishment of northern snakeheads in the tidal Schuylkill River. A volunteer librarian at the McLean Library of the Pennsylvania Horticultural Society discovered in the library's collection and made avail-

able to me Thomas Meehan's nursery catalog from 1858. Joseph K. Sheldon, professor of biology at Messiah College, gave me a firsthand account of his discovery of the flatworm *Bipalium pennsylvanicum* near Philadelphia. Keith Russell, of the National Audubon Society, advised me on interpretation of his online postings of winter bird counts in Philadelphia. Brenda Malinics told me about her rehabilitation of local silver-haired bats, including the one I brought to the Wildlife Rehabilitation Clinic of the Schuylkill Valley Center for Environmental Education. Leo Sheng reported observations based on his fishing in the Schuylkill River; he reported the behavior and local distribution of brown bullheads and took the photograph that I included in this book. Bradley Maule, coeditor of *Hidden City Daily*, generously allowed me to use his photograph of a red-tailed hawk eating a squirrel in Fairmount Park. Martin F. Heyworth, physician at the Philadelphia Veterans Affairs Medical Center, identified beetles that we encountered in Center City. Many neighbors graciously endured my poking around their properties and taking photographs.

Susan Alix Williams in Rowe, Massachusetts, identified the tree mosses, *Orthotrichum pumilum* and *Syntrichia papillosa*, I found in Center City. Through email correspondence, Susan Munch, associate professor emerita of biology at Albright College, guided me toward final identification of the liverwort *Reboulia hemisphaerica* in Center City. Sara M. Lewis, professor of evolutionary and behavioral ecology at Tufts University, hypothesized in correspondence with me that light pollution might be the reason that *Photuris* fireflies are absent in Center City. In correspondence, Peter K. Ducey, professor of biological sciences, State University of New York at Cortland, counseled me on how to search for predatory terrestrial flatworms.

Joel Katz read the first manuscript for this book and provided encouragement and guidance; Joel Katz Design Associates produced the map of Center City. Heather Diacont Rinehart drew a diagnostic picture of *Bipalium pennsylvanicum* based on photos and descriptions in the species' original description. Edward S. Barnard mentored me during my completion of the manuscript and my preparing it for submission for publication. Diane Fredrick, my editor, has improved this book in countless ways.

Finally, my wife, Susan, has been my partner in every stage of my studies of natural history.

I have used captions to credit photographs taken by people other than me. Although many people helped me produce this book, I take responsibility for any errors.



Philadelphia fleabane (*Erigeron philadelphicus*) named after this city by Carl Linnaeus in 1753.¹ It is native to North America and grows wild in Center City.

CENTER CITY, PHILADELPHIA

- Chapter 1 The Subway Tree
 - Chapter 2 Red tailed Hawk's nest
 - Chapter 3 House sparrow
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 - Chapter 25 Canada Geese
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 - 3 Independence Mall
 - 4 23rd and Delancey Sts
 - 5 Lemon Hill, Fairmount Park
 - 6 West Philadelphia
 - 7 23rd and Walnut Sts
 - 8 Inside Academy of Natural Sciences
 - 9 Schuylkill River Trail at Chestnut St
 - 10 Bartram's Garden
 - 11 Fairmount Water Works
 - 12 Garden of the College of Physicians
 - 13 Philadelphia Criminal Justice Center
 - 14 2400 block of Waverly St
 - 15 Parallel to Schuylkill Trail
 - 16 Courtyard garden, 25th & Pine Sts
 - 17 22nd and Sansom Sts
 - 18 Eastern State Penitentiary
 - 19 Broad and Bainbridge Sts
 - 20 Fairmount dam
 - 21 Christian St and Schuylkill Ave
 - 22 Filer Square
 - 23 25th and Delancey Sts
 - 24 2500 block of Pine St
 - 25 Schuylkill River Trail by Spring Garden St
 - 26 Logan Square
 - 27 9th and Green Sts



INTRODUCTION



Center City, Philadelphia, along the Schuylkill River, 2007, with University City in the lower left quadrant of the photo. (Aerial photo credit: Bill Cobb at SkylineScenes.com)

Downtown Philadelphia is commonly called Center City. Interstate highways surround Center City on three sides, but destinations within Center City are accessible on foot. Within this urban core are residential streets lined with trees and row houses located a few blocks from bustling commercial districts with vehicular congestion and tall buildings.

Service industries such as health care, finance, education, and tourism have replaced heavy industry and manufacturing, which once dominated Philadelphia's economy. People are wealthier, more educated, and increasing in number in Center City compared to the rest of Philadelphia,¹ which ranks as the nation's fifth most populous city.²

For Philadelphia as a whole, the proportion of the population below the poverty level is 26 percent, which exceeds that in Boston, New York, Baltimore, and Washington, DC, and is twice that for Pennsylvania.³ Philadelphia shares with all these cities a geographic location along the East Coast and a heritage of nineteenth-century neighborhoods.

Two rivers border Center City, the Schuylkill on the west, and the Delaware on the east. Center City has green space in the form of public squares, playgrounds, ball fields, community gardens, pocket parks, and a trail along the Schuylkill River, but these places are manicured; Center City has essentially no urban forest or naturalized areas. Bulkheads, highways, and development along both rivers have eliminated all traces of riparian habitat. On residential streets, most green space is private and hidden behind row houses, which commonly have rear courtyards and gardens. Vacant lots are rare.

Wild plants sprout in almost any sliver of soil, including cracks in pavement and strips between sidewalk and street. Street trees are abundant. Despite heat and desiccation typical of cities, Philadelphia's temperate climate is favorable to growth of plants. The city's annual precipitation of 104 cm is more than that of London (59 cm), Beijing (62 cm), Moscow (63 cm), Rome (65 cm), Chicago (84 cm), and Portland (101 cm), but less than that of Atlanta (120 cm), Seoul (134 cm), and Bangkok (140 cm).⁴

In a comparison of eight American cities, Philadelphia's flora most closely resembled that of New York and Washington, and to a lesser degree Boston; and least that of Detroit, Chicago, Minneapolis, and St. Louis. One third of the flora in these cities was classified as nonnative. The fraction of species of plants common to all eight cities was just over 10 percent for native species and just under 10 percent for nonnative.⁵

Even though it is the core of a large metropolitan area, Center City supports populations of wild plants and animals. Within its dense matrix of streets and buildings are fragments of habitat varied in composition and size. This book explores how these habitats and their wild inhabitants have fared over time.