

# 14

## AMERICAN ROBIN

(*Turdus migratorius*)



**In Pennsylvania, populations of robins have increased over the past decade, while those of other common urban birds have declined.**

*Figure 14.1 American robin. (Hand-colored engraving, "Turdus pilaris migratorius. The Fieldfare. Aristolochia. The snake-root," plate 29 in Mark Catesby's *The Natural History of Carolina, Florida and the Bahama Islands*, vol. I, published in 1731.)*

In 1731, over a century before the publication of Audubon's *Birds of America*, the English naturalist Mark Catesby produced the first volume of *The Natural History of Carolina, Florida and the Bahama Islands*.<sup>1</sup> It includes an engraving of an American robin on its back on a tree stump that resembles a chopping block. The bird's feet are askew up in the air, and its neck hangs down over the edge of the stump. In the accompanying text, Catesby offers no clue as to why he chose to depict the bird as if it were ready to be carved up.

## Delicacy

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Alexander Wilson offers a clue in the first volume of his *American Ornithology*, published in Philadelphia in 1808:<sup>2</sup>

So fond are they of gum-berries, that, wherever there is one of these trees covered with fruit, and flocks of Robins in the neighborhood, the sportsman need only take his stand near it, load, take aim, and fire; one flock succeeding another, with little interruption, almost the whole day: by this method, prodigious slaughter has been made among them with little fatigue.

...When fat, they are in considerable esteem for the table, and probably not inferior to the Turdi of the ancients, which they bestowed so much pains on in feeding and fattening. The birds are frequently and easily raised, bear the confinement of the cage, feed on bread, fruits, &c., sing well, readily learn to imitate parts of tunes, and are very pleasant and cheerful domestics.<sup>3</sup>

## Pokeberries

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The slaughter of robins might have continued were it not for pokeberries. Wilson, whose ornithological career began in Philadelphia,<sup>4</sup> describes how pokeberries protected robins:

Sometimes they will disappear for a week or two, and return again in greater numbers than before, at which time the cities pour out their sportsmen by scores, and the markets are plentifully supplied with them at a cheap rate. In January 1807, two young men, in one excursion after them, shot thirty dozen. In the midst of such devastation, which continued many weeks, and, by accounts, extended from Massachusetts to Maryland, some humane person took advantage of a circumstance common to these birds in winter, to stop the general slaughter. The fruit called poke-berries (*Phytolacca decandra*, Linn) is a favorite repast with the Robin, after they are mellowed by the frost. The juice of the berries is of a beautiful crimson, and they are eaten in such quantities by these birds, that their whole stomachs are strongly tinged with the same red color. A paragraph appeared in the public papers, intimating that, from the great quantities of these berries which the Robins had fed on, they had become unwholesome, and even dangerous food; and that several persons had suffered by eating of them. The strange appearance of the bowels of the birds seemed to corroborate this account. The demand for, and use of them, ceased almost instantly and motives of self-preservation produced at once what all the pleadings of humanity could not effect.<sup>5</sup>



Figure 14.2 Pokeberry (*Phytolacca americana*), a common wild herbaceous perennial plant in Center City.

Warnings about eating robins appeared in a dissertation submitted by Benjamin Shultz for a degree of doctor of medicine at the University of Pennsylvania in 1795. Noting that robins eat pokeberries, he describes the berries:

These, when perfectly ripe, are extremely smooth, and of a dark reddish colour. They of course are very tempting to eat, but this gratification can seldom be enjoyed to any degree, without great inconvenience. Man is not the only animal to whom these berries are unfriendly; many birds are observed to be purged by them. The flesh of those who eat them acquires a high red colour, a disagreeable flavour, and is destitute of adipose substance.<sup>6</sup>

Outside of Philadelphia the mass shooting of robins continued well into the nineteenth century. In the text accompanying *Birds of America*, published in 1834, Audubon describes the slaughter with pleasure:

In all the Southern States...their presence is productive of a sort of jubilee among the gunners, and the havoc made among them with bows and arrows, blowpipes, guns, and traps of different sorts, is wonderful.<sup>7</sup>

## Attraction to human habitation

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Despite the shooting of robins in the eighteenth and nineteenth centuries, the birds were conspicuous around people's homes. In 1749 Peter Kalm, the Swedish naturalist who visited Philadelphia, wrote: "It sings very melodiously, is not very shy, but hops on the ground, quite close to the houses."<sup>8</sup> Two centuries later Witmer Stone, Philadelphia botanist and ornithologist, noted that the robin had recently become the most abundant bird at Cape May. He attributed the population increase to "the steady increase in dwellings with gardens and shrubbery and well-kept lawns."<sup>9</sup> The attraction of robins to human residential development appears to be characteristic of the species rather than to a particular place. In Alberta, increases in robins correlated with settlement of the prairie and creation of gardens, which also introduced earthworms.<sup>10</sup>

Over the past decade populations of robins have increased in Pennsylvania, according to the Breeding Bird Survey.<sup>11</sup> The robin is the most widely distributed bird in the state.<sup>12</sup> Among populations of urban birds in Pennsylvania, only robins have increased, while house finches (*Haemorhous mexicanus*), house sparrows (*Passer domesticus*), and starlings (*Sturnus vulgaris*) have decreased.<sup>13</sup> I have seen robins foraging in Center City throughout the year.

## Urban habitat

Why have robins fared so well in Center City? On the surface, cities would appear to offer them few advantages: cities have only recently become part of robins' evolutionary history. Street pigeons (*Columba livia*) and house sparrows, by contrast, have had millennia to evolve in Europe and the Middle East, where fossils of house sparrows date back 65,000 years,<sup>14</sup> and evidence of domesticated pigeons goes back 4,800 years.<sup>15</sup> Center City does not offer robins, which are indigenous to the region, oceanic barriers that protect them from native enemies; bird feeders downtown provide seed to house sparrows, but robins ignore such offerings; buildings in the city offer potential nesting sites, but robins here typically nest in trees.

Leonard A. Eiserer of Franklin and Marshall College in Lancaster, Pennsylvania, observed that lawn mowing attracts robins. He found that the time robins spent on lawns decreased as the height of grass increased. Given a choice, robins foraged on lawns whose grass was short rather than long. The act of lawn mowing itself, independent of height of grass, drew robins. Eiserer surmised that robins fed on insects that lawn mowing exposed.<sup>16</sup> Mowing grass theoretically may nurture earthworms: mowed fragments of blades of grass are just the right size for earthworms to pull into their burrows. Mowing, grass clippings, and mulch increase populations of earthworms or their castings.<sup>17</sup> I suspect shorter grass improves robins' mobility on the ground and their capacity to spot and seize prey.

In Center City, sprinklers attract robins in parks and in our garden. The water brings earthworms to the surface, as it does after rain.<sup>18</sup> In our backyard in the summer, robins are quick to forage after I have gardened and exposed freshly turned earth. Invertebrates other than earthworms are diverse and abundant in urban and suburban gardens.<sup>19</sup> Robins have been found to eat invertebrates in ninety-one families.<sup>20</sup>

Short grass and bare ground may protect robins from exposure to ectoparasites such as lice, louse flies, mites, and ticks. Robins have been found to harbor fifteen species of these arthropods.<sup>21</sup> Over a third of robins sampled using mist nets in Lyme, Connecticut, carried *Ixodes scapularis*, the tick that transmits the spirochete causing human Lyme disease. Just under a third of robins in this survey were coinfecte with both nymphs and larvae of these ticks.<sup>22</sup> Robins harbor not only the Lyme disease tick, but also the Lyme disease pathogen, *Borrelia burgdorferi*.<sup>23</sup> In Maryland, the number of *Ixodes* ticks per robin declined with increasing urbanization.<sup>24</sup>

### Precolonial contact with agriculture

The attraction of robins to yards and gardens dates back to our earliest records of this bird's behavior; it persisted even in the face of systematic hunting. Red-tailed hawks, in contrast, were reclusive in the face of hunting; only after protections were enforced did they habituate to people. The affinity of robins for human habitation likely preceded European settlement.

Native Americans presented robins with opportunities to forage in gardens long before the arrival of Europeans.<sup>25</sup> Crops found in prehistoric archaeological sites in Pennsylvania include squash (*Cucurbita pepo*), maize (*Zea mays mays*), tobacco (*Nicotiana* sp.), sunflower (*Helianthus annuus*), bean (*Phaseolus vulgaris*), and goosefoot (*Chenopodium* sp.). The age of the oldest remnants of crops dated by radiocarbon in this region is over 2,000 years.<sup>26</sup> Native Americans once gardened across the continent,<sup>27</sup> including in Arizona and New Mexico, where archaeological excavation of abandoned pueblos turned up bones of robins.<sup>28</sup> The American robin evolved in Central America and later colonized North America from coast to coast.<sup>29</sup> Robins likely foraged in pre-Columbian Native American gardens just as they did in gardens of European settlers, and as they do in gardens in Center City today.

## Berries

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In Center City's old courtyards, wild and ornamental trees and shrubs offer robins abundant berries, especially in winter. Vines that produce berries include Virginia creeper (*Parthenocissus quinquefolia*), Japanese honeysuckle (*Lonicera japonica*), English ivy (*Hedera helix*), and oriental bittersweet (*Celastrus orbiculatus*).<sup>30</sup> Shrubs and trees presenting food to robins include hawthorn (*Crataegus*), holly (*Ilex*), crabapple (*Malus*), mountain ash (*Sorbus*), mulberry (*Morus*), hackberry (*Celtis*), dogwood (*Cornus*), juniper (*Juniperus*), sumac (*Rhus*), and cherry (*Prunus*).<sup>31</sup>

In the spring, suburban robins have been found to begin breeding earlier than rural robins.<sup>32</sup> One possible explanation is the abundance of ornamental berries available during the winter around suburban homes and parks.



Figure 14.3 Virginia creeper (*Parthenocissus quinquefolia*) on the wall of the municipal swimming pool building on Taney Street in Center City. Robins eat its berries.

In his *Compendium Florae Philadelphicae*, published in 1818, William P. C. Barton described the city's flora, including vines with berries lasting into winter. One example is native bittersweet, *Celastrus scandens*:

A climbing plant frequently reaching the tops of trees, twenty or thirty feet high. Flowers yellowish white, small. Berries a bright orange-red. Said to possess medicinal virtues. In hedges and among small trees and shrubs on rocky ground. Frequent near Mendenhall's tavern on the east bank of the Schuylkill, not far from the falls along the fences; and in the stony and hilly copices back of Powelton, abundant.<sup>33</sup>

Among the most common native woody vines to colonize successional habitats in Philadelphia outside of Center City today is poison ivy (*Toxicodendron radicans*), whose berries are eaten by robins.<sup>34</sup> Barton called it "Poison Vine" and described it as follows:

No plant is more generally known than this. It is extremely poisonous. Berries white... Particularly common along fences...are possessed of medicinal virtues.<sup>35</sup>

In Center City, robins' supply of berries is more secure than the supply of small seeds that sustain house finches and house sparrows. Berries are abundant on vines, shrubs, and trees, whereas small seeds are available mostly in bird feeders and herbaceous weeds. Property owners apply herbicides to wild herbaceous plants, which in Center City typically grow in cracks at the base of buildings and in pavement. Destruction of these plants may in part explain why populations of house sparrows and house finches have declined compared to those of robins.<sup>36</sup>

## Viruses, raptors, cats, and other enemies

Center City may buffer robins from predators and competitors less well adapted to downtown. Despite the conspicuous presence of red-tailed and Cooper's hawks, most species of raptors known to prey on robins<sup>37</sup> are not common downtown. Arborial snakes, which are nest predators, are absent. Starlings, which have been observed stealing worms from robins,<sup>38</sup> are common but have declined in numbers in Pennsylvania.<sup>39</sup>

In Middle Atlantic and Northeastern states, West Nile virus has caused declines in populations of both robins and its nest predators, including American crows and blue jays.<sup>40</sup> In 2010 the Philadelphia Department of Public Health reported mosquitos infected with West Nile virus in every section of the city surveyed, including Center City. It also reported thirteen human cases of illness caused by West Nile virus infection.<sup>41</sup> West Nile virus paradoxically could have boosted populations of robins if their immunity to infection by the virus exceeded that of their nest predators.<sup>42</sup>

Free-ranging domestic cats in the United States have been estimated to kill over a billion birds annually, but mortality of robins due to cats in Center City is unknown.<sup>43</sup> Also unknown is the mortality due to squirrels, which are nest predators of robins.<sup>44</sup>

## Cowbirds

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Robins are well defended against one common enemy here: the brown-headed cowbird (*Molothrus ater*). Alexander Wilson described the behavior of cowbirds in 1810:

The most remarkable trait in the character of this species is the unaccountable practice it has of dropping its eggs into the nests of other birds, instead of building and hatching for itself; and thus entirely abandoning its progeny to the care and mercy of strangers.<sup>45</sup>



Figure 14.4 Brown-headed cowbird (*Molothrus ater*) on a lawn off Martin Luther King Drive, Philadelphia.



Figure 14.5 Intact, speckled egg on brick sidewalk of 2400 block of Waverly Street in Center City. The setting and appearance of this egg suggest it is an ejected egg of a cowbird.

In experiments conducted in Michigan and Connecticut, robins rejected artificial and real cowbird eggs, usually by ejecting the eggs from their nests.<sup>46</sup> Robin eggs are clear blue, in contrast to cowbird eggs, which are white with spots; cowbird eggs are smaller than robin eggs. When artificial cowbird eggs were experimentally deposited in robin's nests, robins accepted cowbird eggs painted clear blue, but rejected cowbird eggs painted blue with spots, or clear white.<sup>47</sup> Song sparrows, in contrast, do not reject cowbird eggs, and their populations have increased when local cowbirds were trapped and removed.<sup>48</sup>

How did robins evolve defenses against brood parasitism by urban cowbirds? The brown-headed cowbird, like the American robin, evolved in Central America and dispersed over most of North America.<sup>49</sup> It inhabited North America for at least a million years and likely peaked in abundance 15,000–20,000 years ago, when North America supported its greatest diversity of large mammals, including bison, oxen, horses, llamas, camels, mammoths, and mastodons.<sup>50</sup>

In 1799 Benjamin Smith Barton, professor of *materia medica*, natural history, and botany at the University of Pennsylvania, described how the brown-headed cowbird foraged in Pennsylvania:

It follows cows and horses, pulling asunder their excrements, in order to get at the seeds. It alights on their backs, eating flies and other insects from them. In some parts of Pennsylvania, it is best known by the name of Cow-Bird.<sup>51</sup>

By the time horses and cows disappeared from North American cities, cowbirds had become urbanized. Brown-headed cowbirds have recently been found to be more abundant in urban than rural areas.<sup>52</sup> Robins and cowbirds forage together on lawns in Center City.

Wherever the two species coexisted, brood parasitism in cowbirds would have exerted selective pressure on robins.<sup>53</sup> The clear blue color of robin eggs may have evolved in response to cowbirds, or it may have evolved initially in response to other selective pressures, such as predatory attacks on robin eggs<sup>54</sup> and then secondarily as a defense against brood parasitism.<sup>55</sup> Whatever the sequence, robins had to cope with cowbirds long before the two met in Center City.<sup>56</sup>

## Latitude, altitude, and temperature

The earliest systematic records of robins in Philadelphia date to 1802, when William Bartram began a twenty-year log of observations on weather and natural history at his home, about 3 kilometers from today's Center City. Entries in his log indicate that he saw robins in the month of January for eight years, including eleven days in January 1821, when he noted that the temperature fell to  $-8^{\circ}\text{F}$ , the ice on the Schuylkill River was 12–14 inches thick, and the ground was covered with 3 inches of snow. He observed that traffic on the ice across the Delaware River was constant, and included carts and sleds drawn by teams of six horses transporting hay and wood.<sup>57</sup>

The mortality of robins under such icy conditions is unknown, but the caloric intake required for maintaining body temperature in winter can exceed robins' capacity to consume berries.<sup>58</sup>

To explain the overwintering of robins in Philadelphia, Alexander Wilson offered one hypothesis, which he linked to the name *Turdus migratorius*:

The name of this bird bespeaks him a bird of passage, as are all the different species of Thrushes we have; but the one we are now describing being more unsettled, and continually roving about from one region to another, during fall and winter, seems particularly entitled to the appellation. Scarce a winter passes but innumerable thousands of them are seen in the lower parts of the whole Atlantic states, from New Hampshire to Carolina particularly in the neighbourhood of our towns; and from the circumstance of their leaving, during that season, the country to the northwest of the great range of the Alleghany, from Maryland northward, it would appear that they not only migrate from north to south, but from west to east, to avoid the deep snows that generally prevail on these high regions for at least four months in the year.<sup>59</sup>

The *Canadian Atlas of Bird Banding* has documented robins migrating southeast from Ontario across the Allegheny plateau and southeastern Pennsylvania to southern New Jersey and Maryland.<sup>60</sup> Philadelphia offers overwintering robins refuge from cold associated with higher latitude and altitude.

## Heat island

Measured by satellite infrared imaging, Center City is typically warmer than surrounding suburbs by 1.7 to 3.3°C (3–6°F); on clear, calm winter nights, it is warmer than nearby rural areas by 5.6 to 11°C (10–20°F).<sup>61</sup> Satellite spectroradiometric imaging has monitored the onset of “greenup” (vegetation leafing out) in the spring along the Washington–Philadelphia–New York corridor. Greenup was 8.7 days earlier within urban cores compared to 8 to 10 kilometers outside. The rise in surface temperature along a gradient from rural areas to urban cores paralleled the advance of greenup. The growing season in urban core areas was 15 days longer than in outlying rural areas.<sup>62</sup> Thermal mapping of Center City shows variation in elevated surface temperatures according to the landscape; for example, Rittenhouse Square stands out as relatively cool, corresponding to its tree canopy.<sup>63</sup>

Center City’s heat island is a result of pavement and buildings that trap solar energy during the day and radiate it at night, along with heat generators such as cars, air conditioners, and power plants.<sup>64</sup> However, William Bartram’s records demonstrate that overwintering of robins in Philadelphia preceded the city’s heat island.<sup>65</sup>

In Columbus, Ohio, an urban heat island effect was demonstrated in the case of the northern cardinal (*Cardinalis cardinalis*), which nested and formed clutches 7 to 10 days earlier in urban compared to rural habitats. The difference was found to be due to higher urban temperatures and not to greater availability of food.

## Climate warming

Climate warming has advanced seasonal behavior of robins. By the spring of 2000, robins were arriving 14 days earlier than they had in 1981 at their breeding grounds in the Rocky Mountains in Colorado.<sup>66</sup> Advanced arrival times of robins in spring in Maine have correlated with higher temperatures in Maine and New England.<sup>67</sup> Comparable studies have not been done in Philadelphia, where robins newly arrived from the south are indistinguishable from those that have overwintered here from the north.

## Light pollution

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American robins typically start singing at dawn, but in Center City in early spring, I have heard them start by 2 a.m. Mark W. Miller of the U.S. Geological Survey hypothesized that light pollution advances the time when robins begin singing. In Schuylkill County, Pennsylvania, he found that robins exposed to light pollution of high intensity began singing as early as 1:10 a.m., the earliest ever reported. On average, they began singing 107 minutes earlier than did robins exposed to no light pollution, and 68 minutes earlier than did robins exposed to moderate light pollution.<sup>68</sup>

Similar findings have been reported for dawn singing in four species of European songbirds. The consequences of shifting the onset of singing to earlier times in the morning included disturbances in the timing of reproductive behavior.<sup>69</sup>

## Noise pollution

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Noise pollution has shifted the timing of bird songs. The European robin (*Erithacus rubecula*) typically sings during the day; but in noisy neighborhoods in Sheffield, England, it sings at night. An analysis of noise levels in over a hundred locations in the city concluded that daytime noise induced the birds to sing at night. The birds sang at night even when levels of artificial light were low.<sup>70</sup>

Traffic noise has shifted the spectral characteristics of the American robin's song.<sup>71</sup> Spectral shifts in response to noise vary not only with emission of noise but also with nearby impervious surfaces, which cause sounds to reverberate.<sup>72</sup> In theory, noise and light pollution could act synergistically on robins' song.

## Relationships with people

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The robin strips trees and shrubs of ornamental berries and harbors West Nile virus; it carries Lyme disease ticks and the Lyme disease pathogen, *Borrelia burgdorferi*; yet it is exempt from the kind of persecution endured by pigeons and starlings. Alexander Wilson considered the affection that people reserve for robins and concluded that it transcends the beauty of its song. He suggested that people associate its song with spring, and the name "robin" with the European robin, a species much admired:

This song has some resemblance to, and indeed is no bad imitation of the notes of the Thrush or Thrasher (*Turdus rufus*); but if deficient in point of execution, he possesses more simplicity; and makes up in zeal what he wants in talent; so that the notes of the Robin, in spring, are universally known, and as universally beloved. They are as it were the prelude to the grand general concert that is about to burst upon us from woods, fields and thickets, whitened with blossoms, and breathing fragrance. By the usual association of ideas, we therefore listen with more pleasure to this cheerful bird than to many others possessed of far superior powers, and much greater variety. Even his nest is held more sacred among schoolboys than that of some others; and while they will exult in plundering a Jay's or a Catbird's, a general sentiment of respect prevails on the discovery of a Robin's. Whether he owes not some little of this veneration to the well known and long established character of his namesake in Britain, by a like association of ideas, I will not pretend to determine. He possesses a good deal of his suavity of manners; and almost always seeks shelter for his young in summer, and subsistence for himself in the extremes of winter, near the habitations of man.<sup>73</sup>

In Louisville, Kentucky, a study measured the distance robins allowed people to approach before they took flight. Robins tolerated people at closest distances when people approached them on paths and did not look at them. These responses appeared to be learned: in all trials, adult robins allowed people to approach closer than did young robins.<sup>74</sup> A study in Seattle measured flight responses of birds in neighborhoods where people reported that they repelled birds: American crows (*Corvus brachyrhynchos*) and European starlings (*Sturnus vulgaris*)—but not American robins—exhibited exaggerated flight responses.<sup>75</sup>

Alexander Wilson noted two centuries ago that people are less likely to persecute robins than other birds. Popular regard for robins has endured, endowing robins with rich rewards: berries, worms, lawns, water, nesting sites, and protection from ectoparasites and predators. In Pennsylvania, it may account, at least in part, for increasing numbers of robins.