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SANCTUARY

THE JOURNAL OF THE MASSACHUSETTS AUDUBON SOCIETY



And No Birds Sing
Fifty Years Since *Silent Spring*

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A Personal Thank You to Our Members

Long before I became the president of Mass Audubon, I was a loyal member who appreciated the organization's impressive history of conservation achievement. So, in 1999, I was proud and humbled to be named the seventh president of Mass Audubon. And now, thirteen action-packed years later, I have decided to step down by the end of 2012.



Deciding to leave Mass Audubon was a hard choice, but after much thought I concluded that both organizations and people need occasional repotting, and that this is a time for Mass Audubon and me to undergo that transition. Leading Mass Audubon has been an extraordinary privilege, and I have learned so much here. Now I look forward to applying that knowledge and experience to new endeavors, and I believe that Mass Audubon will benefit from the energy and ideas of a new leader. Rest assured that Mass Audubon is on solid ground as it moves forward in its search for a new president.

As I reflect on the many accomplishments during my tenure, what stands out for me are the people I have been privileged to work with—members, staff, volunteers, partners, and colleagues. Together we have achieved great things, and we have moved toward an even more impressive record of success. Most gratifying are themes spelled out in our strategic plan.

Connecting people and nature. Long a hallmark of Mass Audubon, our programs and sanctuaries provide fun, safe, and educational—indeed transformative—opportunities for everyone to enjoy and understand nature. We have placed significant emphasis and effort on reaching new audiences, launching urban nature centers and programs, and seeking new partnerships.

Protecting and stewarding habitats. Our outstanding sanctuary system helps safeguard the rich biodiversity of the state, and we have protected more than 6,000 additional acres during my time as president. We continue to aspire to the highest standard of land stewardship, including invasive species management and ecological restoration on our sanctuaries. Our bird conservation work, ranging from the Coastal Waterbird Program to our recently published *State of the Birds*, has had an enormous impact.

Responding to climate change. This past decade, we have been forced to grapple with this looming threat and decide what Mass Audubon can and should do. We have responded by reducing our own carbon footprint by more than 40 percent, seeking to educate ourselves and others about climate change, and advocating for a renewable and clean energy future.

It will be many months before I officially step down, and when I do I will remain a proud member. In the meantime, I promise that we will continue to move ahead together with our ambitious agenda of conservation, education, and advocacy. Please accept my personal thanks to each of you for your generous support through the years.

Laura Johnson, President

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Luna moth

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Mass Audubon works to protect the nature of Massachusetts for people and wildlife. Together with more than 100,000 members, we care for 34,000 acres of conservation land, provide educational programs for 225,000 children and adults annually, and advocate for sound environmental policies at local, state, and federal levels. Mass Audubon's mission and actions have expanded since our beginning in 1896 when our founders set out to stop the slaughter of birds for use on women's fashions. Today we are the largest conservation organization in New England. Our statewide network of wildlife sanctuaries, in 90 Massachusetts communities, welcomes visitors of all ages and serves as the base for our work. To support these important efforts, call 800-AUDUBON (283-8266) or visit www.massaudubon.org.

Earth Shakers

At the exact moment of the 1989 San Francisco earthquake, someone here on the other side of the North American continent smashed into the rear end of my car as I was headed to an event in Boston. The car was rammed off the road into a ditch, but, resolute, after the requisite exchange of papers, I decided to forge on. I didn't want to miss the occasion.

The event was an aftershock of another sort of earthquake. It was a celebration of the 80th birthday of Paul Brooks, who had been the editor in chief at Houghton Mifflin for twenty-five years. Many members of the old guard of the 1960s publishing and environmental movement were there that night, and there were many honoring speeches, and much raising of glasses, and jokes, and banter, and not a little seriousness.

Brooks himself had published a number of natural history and environmental books and essays. But perhaps his best work was behind-the-scenes. It was he who, against the odds, accepted a book idea for a field guide to birds by a virtually unknown bird painter named Roger Tory Peterson. It was also Paul Brooks who encouraged a modest peaceful nature lover and biologist named Rachel Carson, who had published three successful books on sea life, to jump into what turned out to be the forefront of the emerging environmental movement at the dawn of the sixties.

The book was *Silent Spring* and, as both Brooks and Carson expected, the work lit a veritable firestorm of criticism from the affected corporations. It also sparked the fire—more than any other single publication—of a host of activist environmental groups and governmental agencies, including some such as the Environmental Protection Agency that even today are under attack by corporate entities and politicians.

Carson knew all too well that she would be personally criticized, and even ridiculed and labeled incompetent as a result of the publication. Even though she had assembled a vast amount of scientifically irrefutable evidence on the poisoning of the earth, she was at first reluctant to write a full-length book. Not only that, concentrating on environmental destruction was the opposite of what she had done with her other books. *The Sea Around Us*, *The Edge of the Sea*, and *Under the Sea-Wind* were celebrations of life. *Silent Spring* was to be a diatribe against the indiscriminate application of chemicals of death.



Rachel Carson

And yet, Carson was above all a naturalist, an aficionado of all things wild and free, and after some fifteen years of research she had come to understand that unless the onslaught of chemicals aimed at the destruction of agricultural pests was curtailed everything she loved—including the 97 percent of beneficial or harmless insects and some of the brightest and best songsters of the bird world—would be sadly diminished, even driven to extinction.

She had attempted to publish magazine articles about the pesticide problem, but none of the journals she or her agent approached would dare to take on the subject. Paul Brooks was the only book publisher who saw the importance of the endeavor and encouraged her to carry on.

Houghton Mifflin had already published *The Edge of the Sea*, which had become, along with *The Sea Around Us*, a best seller, and Brooks, knowing Carson to be not only a fluid writer but also a tireless and accurate researcher, encouraged her all along the way and worked closely with her on drafts.

Silent Spring was published in 1962, after four years of writing. It appeared first in serial form in *The New Yorker* in June and was published in book form in September.

Everyone involved in the project expected trouble, but perhaps not the extreme reaction the book received. As Paul Brooks wrote in his own book about Rachel Carson, *The House of Life*, except perhaps for Darwin's *The Origin of the Species*, no single book garnered as much vitriol as *Silent Spring*. Carson was immediately marginalized by some as a "little old lady in tennis shoes"—as all women conservationists of that era were termed. She was denounced as a "hysterical women," and, after the corporation stiff's couldn't dig out any juicy moral depravity with which to discredit her, she was termed "a nun of nature."

Be that as it may, she and the book endured.

In the end, Paul Brooks suggested that the anger that pesticide companies, the Department of Agriculture, and the food industry leveled against her went far deeper. She had in effect struck at the arrogance of Western technological society, the ultimate hubris of the belief that human beings can control nature.

JHM

A Fable for Tomorrow

There was once a town in the heart of America where all life seemed to live in harmony with its surroundings. The town lay in the midst of a checkerboard of prosperous farms, with fields of grain and hillsides of orchards where, in spring, white clouds of bloom drifted above the green fields. In autumn, oak and maple and birch set up a blaze of color that flamed and flickered across a backdrop of pines. Then foxes barked in the hills and deer silently crossed the fields, half hidden in the mists of the fall mornings.

Along the roads, laurel, viburnum and alder, great ferns and wildflowers delighted the traveler's eye through much of the year. Even in winter the roadsides were places of beauty, where countless birds came to feed on the berries and on the seed heads of the dried weeds rising above the snow. The countryside was, in fact, famous for the abundance and variety of its bird life, and when the flood of migrants was pouring in through spring and fall people traveled great distances to observe them. Others came to fish the streams, which flowed clear and cold out of the hills and contained shady pools where trout lay. So it had been from the days many years ago when the first settlers raised their houses, sank their wells, and built their barns.

Then a strange blight crept over the area and everything began to change. Some evil spell had settled on the community: mysterious maladies swept the flocks of chickens; the cattle and sheep sickened and died. Everywhere was a shadow of death. The farmers spoke of much illness among their families. In the town the doctors had become more and more puzzled by new kinds of sickness appearing among their patients. There had been several sudden and unexplained deaths, not only among adults but even among children, who would be stricken suddenly while at play and die within a few hours.

There was a strange stillness. The birds, for example—where had they gone? Many people spoke of them, puzzled and disturbed. The feeding stations in the backyards were deserted. The few birds seen anywhere were moribund; they trembled violently and could not fly. It was a spring without voices. On the mornings that had once throbbed with the dawn chorus of robins, catbirds, doves, jays, wrens, and scores of other bird voices there was now no sound; only silence lay over the fields and woods and marsh.

On the farms the hens brooded, but no chicks hatched. The farmers complained that they were unable to raise any pigs—the litters were small and the young survived only a few days. The apple trees were coming into bloom

DRAWINGS BY LOIS DARLING FROM SILENT SPRING BY RACHEL CARSON. COPYRIGHT © 1962 BY RACHEL L. CARSON, RENEWED 1990 BY ROGER CHRISTIE. REPRINTED BY PERMISSION OF HOUGHTON MIFFLIN HARCOURT PUBLISHING COMPANY. ALL RIGHTS RESERVED.



but no bees droned among the blossoms, so there was no pollination and there would be no fruit.

The roadsides, once so attractive, were now lined with browned and withered vegetation as though swept by fire. These, too, were silent, deserted by all living things. Even the streams were now lifeless. Anglers no longer visited them, for all the fish had died.

In the gutters under the eaves and between the shingles of the roofs, a white granular powder still showed a few patches; some weeks before it had fallen like snow upon the roofs and the lawns, the fields and streams.

No witchcraft, no enemy action had silenced the birth of new life in this stricken world. The people had done it themselves.

This town does not actually exist, but it might easily have a thousand counterparts in America or elsewhere in the world. I know of no community that has experienced all the misfortunes I describe. Yet every one of these disasters has actually happened somewhere, and many real communities have already suffered a substantial number of them. A grim specter has crept upon us almost unnoticed, and this imagined tragedy may easily become a stark reality we all shall know.

What has already silenced the voices of spring in countless towns in America? This book is an attempt to explain.

Excerpted from Silent Spring by Rachel Carson.

The Trailblazer

The life and times of Rachel Carson

by Gayle Goddard-Taylor

“Only within the 20th Century has biological thought been focused on ecology, or the relation of the living creature to its environment.... So delicately interwoven are the relationships that when we disturb one thread of the community fabric we alter it all—perhaps almost imperceptibly, perhaps so drastically that destruction follows.”

Rachel Carson

Essay on the Biological Sciences in *Good Reading* (1958)

Rachel Carson understood that all that she saw, and much that she didn't, functioned as a balanced whole. It was something she gleaned from spending many solitary hours contemplating tidal pools teeming with life and the world of insects that came alive in her backyard at night. Physically fragile and by nature private, Carson seems hardly the candidate to face off a powerful chemical industry. Yet she did just that.

Although her most widely known book, *Silent Spring*, published fifty years ago, stirred a sea change in the way people look at pesticides, insecticides, and other toxins, Carson had long been inspiring readers of her earlier writings to look with new eyes at the natural world and see the intertwined relationships within. And while she didn't seek celebrity, neither did she shrink from it when her books generated enormous interest.

In his biography of Carson, *The House of Life*, her late editor and friend Paul Brooks recalls that she neither took success for granted nor gave short shrift to the letters it generated from her readers. “She would drive to her cottage in Maine with a carload of fan mail, determined to answer as many letters personally as her time and strength allowed,” he wrote.

Born in 1907 in Springvale, Pennsylvania, Rachel Louise Carson grew up on a small farm, where she loved nothing more than to explore the rural landscape—encouraged by a mother who shared her interest in the natural world. As a high school student, a bookish Carson seemed to be charting an early plan to become a writer: at the age of 10, she penned a story that was published in *St. Nicholas*, a children's magazine.

She continued to pursue writing in college, although a course in biology so fascinated her that she switched her major to zoology. Ultimately, she combined both interests into one career when she took a job as a biologist with the Bureau of Fisheries in Washington, D.C., which involved her in the bureau's publications.

Brooks credits Carson's essay, *Undersea*—published in 1937 by the *Atlantic Monthly*—as the launching pad

for her later success as a writer. In fact, the essay greatly impressed two giants of the literary world. Quincy Howe, then editor at Simon & Schuster, urged her to write a book—and to discuss it with him if she did. Hendrik Willem van Loon, author of the best-selling *The Story of Mankind*, arranged for Carson and Howe to meet.

Encouraged by their interest, Carson set to work on what would become her first book, *Under the Sea-Wind*, published in November 1941. Carson described this first book project as “a series of descriptive narratives unfolding successively the life of the shore, the open sea, and the sea bottom.”

In this inaugural work, Carson the biologist and Carson the writer came together in eloquent synergy. Departing from the tradition of dense scientific writing, Carson evoked images that she saw in the natural world in the mind of the reader. In one chapter, Carson writes lyrically about the death and subsequent regeneration of a species of jellyfish.

“Now the southwest storm, kneading the waters deeply, had found the moon jellies. Rough waters seized them and hurried them shoreward.... Here their battered bodies became once more a part of the sea, but not until the larvae held within their arms had been liberated into the shallow waters...settling down for the winter on the stones and shells, so that in the spring a new swarm of tiny bells might rise and float away.”

But all of Carson's writing skills were not sufficient to counter the ill-timed release of *Under the Sea-Wind* in 1941, the eve of America's entry into World War II. Lackluster book sales and small compensation for her effort might have discouraged Carson but for an enthusiastic response from the scientific community. In fact, excerpts from the book were used later by explorer William Beebe in his anthology *The Book of Naturalists*.

During the war years, Carson's role evolved in what had become the U.S. Fish and Wildlife Service from assistant aquatic biologist to ultimately biologist and chief editor for the service's various publications. With each advancement came increased duties, leaving Carson little time for her own writing. According to Brooks, she complained to a friend, “...if I could choose what seems to me the ideal existence, it would be just to live by writing.”

Despite her increased workload and the responsibility of caring for her mother and two nieces, Carson was, as always, able to detach from these pressures whenever she found herself out in nature—even if that happened to be in her own backyard. In a passage that would later be included in *The Sense of Wonder*, she wrote: “After an

hour of exploring by flashlight, you realize as never before how alive the night is. It is alive with a thousand watchful eyes. It is filled with the tenseness of the weak who must be swift to evade their stronger enemies. It is vibrant with the stealth and cunning of those who must stalk their prey to live.”

In 1946, Carson rented a cabin on the Sheepscot River near Boothbay, Maine, and spent her days absorbed in the flora and fauna of the river’s edge and the seashore. It became her dream to buy her own place there one day, a dream she realized several years later. The success of her second book, *The Sea Around Us*, allowed her to buy land along the river in West Southport, and there she built a summer cottage.

As her duties at the U.S. Fish and Wildlife Service continued to expand, Carson embarked on a series of booklets that described the ever-growing number of wildlife refuges. The project gave her the opportunity to stress the importance of looking at nature as it functioned as a whole—ecologically.

In one booklet, she wrote, “Wildlife, water, forests, grasslands—all are parts of man’s essential environment; the conservation and effective use of one is impossible except as the others also are conserved.”

It would be a full decade after Carson’s Undersea essay appeared in *Atlantic Monthly* before *The Sea Around Us* was published. It was an ambitious undertaking, but by this time Carson had acquired not only a vast understanding of the subject but also extensive contacts within the oceanographic community.

Her aim in *The Sea Around Us* was to incorporate the latest oceanographic research and newest scientific concepts developed during the war years. As always, though, she wrote this book with the lay person in mind. It took her three years of working late at night and stealing time here and there to complete the book.

After the dismal performance of her first book, Carson decided this time to enlist a literary agent. At the suggestion of friends, she chose Marie Rodell, a decision that resulted not only in a successful literary partnership but also an enduring friendship. While their first attempt to find a publisher failed, it prompted Carson to flesh out the rejected outline with more chapters. Armed with a rough draft that was nearly a third of the proposed book, Carson this time landed a contract with Oxford University Press.

The manuscript for *The Sea Around Us* was completed in July 1950, but initial attempts to publish some of its chapters met with a tepid response. Fifteen prominent publications rejected the advance chapters, but eventually the *Yale Review* and later *Science Digest* did publish some of the advance work. Then, when *The New Yorker* decided to condense about half of the book into a three-part series, Profile of the Sea, the success of *The Sea Around Us* was virtually ensured. The response to the series was enormous and the magazine was deluged with reader mail.

By the time the book was released in July 1951,



© ERICH HARTMANN

Rachel Carson the birdwatcher

Carson had become a celebrity. The *Saturday Review* ran a cover story about her and Oxford University Press struggled to keep the book in stock. By early September, the book topped *The New York Times* best-seller list.

In *The Sea Around Us*, Carson continued to drum a warning about humankind’s abuse of the planet it called home. In a chapter on islands, she tells not only of the birth and death of oceanic islands, but also the extinctions of many species within these fragile ecosystems, events precipitated by human activities.

“The tragedy of oceanic islands lies in the uniqueness, the irreplaceability of the species they have developed by the slow processes of the ages. In a reasonable world men would have treated these islands as precious possessions, as natural museums filled with beautiful and curious works of creation, valuable beyond price because nowhere in the world are they duplicated.”

In the wake of the book’s release, Carson received the John Burroughs Medal, awarded for a natural history book of outstanding literary quality. She also was honored with the National Book Award, which brought with it an automatic boost in sales. The enormous success of the book gave Carson enough financial security to leave her government job and focus on writing.

Her dream of owning a home on the Maine coast now fulfilled, she began traveling the Eastern Shore to gather material for a third book, *The Edge of the Sea*. It was

The Lessons of *Silent Spring*

S*ilent Spring*, Rachel Carson's seminal work, catalogues the effects of synthetic pesticides on wildlife and human health and stands as a call to action to protect the earth—and ourselves—from the indiscriminate use of chemicals that were not well understood 50 years ago but were deemed to represent progress in humankind's battle against the insect world.

While Carson plainly treasured all living things, this is not a Thoreau-inspired plea for wild nature. Rather Carson, the accomplished biologist and established writer, began *Silent Spring* with a clear history of the development of synthetic pesticides post-World War II and then carried on with comprehensive documentation of the impacts of chemicals on the environment—and on insects, birds, mammals, and people.

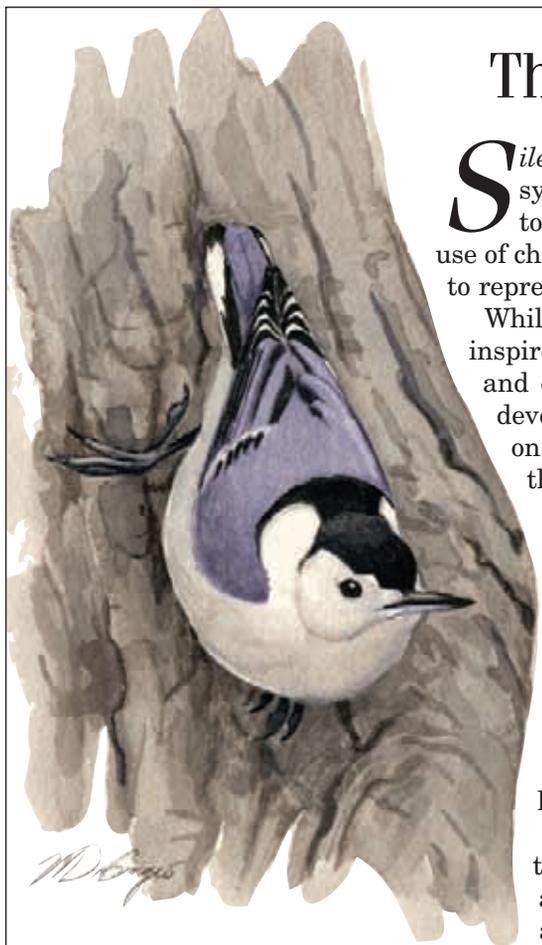
Carson made clear that broad application of relatively untested and little-understood chemicals caused harm—often death—to many living things that were not targeted by the pesticides. She argued that there were other methods to control pest species of insects and that those techniques should be tested and deployed first.

Silent Spring made the forceful case that all things are interconnected—chemicals intended to eradicate bothersome gnats in California made their way up the food chain to wipe out western grebes, which ate fish with concentrated residual chemicals from lake waters. And this could also harm people eating the fish.

Silent Spring and Rachel Carson were aggressively attacked by the chemical industry and by anyone who did not want the arguments and evidence documented in the book to stand in the way of progress and profits. Today we watch with varying degrees of concern as science is denied or ignored with regard to issues such as climate change.

While all of us are concerned about our economy and about jobs and people out of work, why aren't we equally concerned about public health, clean air and water, and the interrelationships among all things? Have we not learned the lessons of *Silent Spring*?

Laura Johnson



White-breasted nuthatch

© MICHAEL DIGORGIO

a labor of love. For Carson, losing herself along the ocean's edge never lost its magic.

When *The Edge of the Sea* was released, it secured for Carson two more awards: the Achievement Award of the American Association of University Women and the citation for outstanding book of the year from the National Council of Women of the United States. But her greatest achievement was still to come—and it would be a radical departure from her previous works.

Carson had long been worried about reports of birds, fish, and insect life being killed following the spraying of toxic chemicals for insect control, such as DDT, dieldrin, and parathion. Armed with scientific expertise and driven by her deep emotional bond to nature, Carson first tried interesting magazines in an article about the dangers of these chemicals. It soon became apparent, however, that she'd have to write a book.

In her four years of research, Carson tapped numerous experts in a variety of fields. Among others were Harold S. Peters, field biologist for the National

Audubon Society, and George J. Wallace, professor of zoology at Michigan State University, both authorities on the disastrous effect of pesticides on birds and wildlife. She also confirmed through Dr. Wilhelm C. Hueper of the National Cancer Institute that DDT was indeed, "a chemical carcinogen."

A book so packed with complex scientific information might have failed to interest the average person, but Carson's convictions and considerable writing skills transformed it into an exultation of nature and a compelling call to action in *Silent Spring*.

Carson's writings opened a window on the workings of nature and, at the same time, educated her readers on what was at stake. It is ironic that her first failed attempts to become published took the form of poetry. But her poetry did find its outlet in her books about the natural world and that poetry continues to inspire new generations.

Gayle Goddard-Taylor is a field editor for Sanctuary magazine.

Silent No More

Thanks to a friend in Massachusetts, Rachel Carson concluded that she could no longer keep quiet about the heedless use of pesticides and its danger to wildlife.

by Ann Prince

“Olga Owens Huckins told me of her own bitter experience of a small world made lifeless,” Carson wrote in the *Silent Spring* acknowledgments. “I then realized I must write this book.”

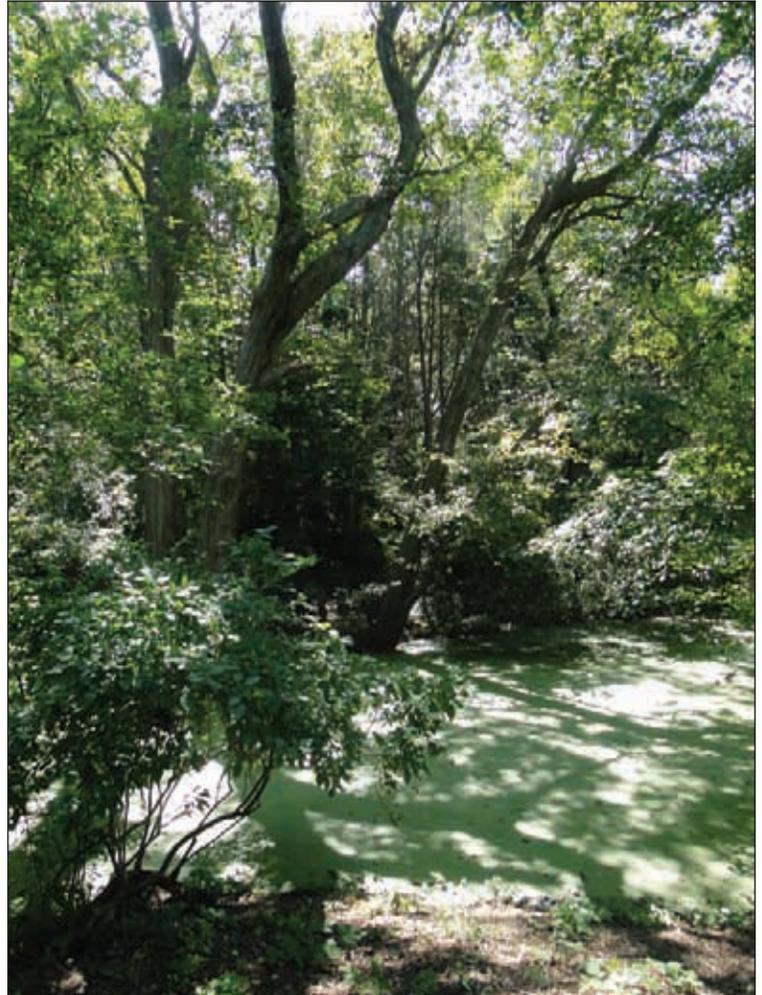
That small world was Stuart and Olga Huckins’ two-acre bird sanctuary on a small peninsula called Powder Point in the coastal town of Duxbury. The Huckins were intimately aware of their avian neighbors, for which they maintained a special section of wildland on their property. A pond, wetlands, and woodland on the site—so close to the shore—made it a desirable haven for birds to reside, nest, feed, and rest during migration.

Carson and Huckins became acquainted in 1951 when Huckins, a literary editor, wrote a complimentary review of Carson’s *The Sea Around Us* in *The Boston Post*. When Carson received the National Book Award for that acclaimed best seller, they stayed in the same New York City hotel to attend the ceremony. After that event, not only did the two women begin to correspond but they welcomed each other to their respective homes. “We found that we had much in common,” Huckins reported regarding her friendship with Carson in the *Duxbury Clipper Garden Club Notes* [July 1963]. “She visited us in Duxbury, and we have often been at her home, a lovely and quiet place outside a big city.”

According to former Mass Audubon South Shore Sanctuaries Director David Clapp, Rachel Carson fully appreciated her time in Duxbury with Stuart and Olga Huckins: “She would visit and enjoy the town, the beach, the outdoors, the birds, and the remoteness of the small house in the center of Powder Point,” he said. Both women were writers and birdwatchers so it only made sense that they would appreciate the camaraderie.

As is true with birders today, the Huckins were attuned to the avifauna of the area, and their love for their backyard birds was evident to Carson. According to Bob Hale, author and bookseller, who lived in Duxbury for many years and knew the Huckins well, the couple was “very aware of the local birds,” particularly those of their own sanctuary. They knew the daily activities of the neighborhood birds and their habits from year to year. As a result, they were the first to notice if anything changed.

So it had to have been devastating when, in the sum-



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Aerial spraying over the Huckins’ bird sanctuary in Duxbury and the death of their birds spurred the writing of Silent Spring.

mer of 1957, small planes flew over Powder Point spraying a deadly mixture of fuel oil and DDT in the name of mosquito control, killing birds outright and annihilating beneficial and harmless insects including bees and grasshoppers. Olga Huckins sent a letter to *The Boston Herald* and also one to Carson. “It was natural that I told her about the Duxbury spraying incident,” explained Huckins after *Silent Spring* was published, “because we knew she would understand our grief, and that she was steadily accumulating data.”

In her letters to *The Boston Herald* and to Rachel Carson, Huckins expressed her belief that spraying poison over private land was a “serious intrusion.” She



Judi and Terry Vose have preserved and are working on ecological restoration of the Huckins' bird sanctuary in Duxbury.

went on to describe the awful scene in the *Herald* piece.

"The 'harmless' shower bath killed seven of our lovely songbirds outright. We picked up three dead bodies the next morning right by the door. They were birds that had lived close to us, trusted us, and built their nests in our trees year after year. The next day three were scattered around the bird bath. On the following day one

robin dropped suddenly from a branch in our woods. We were too heartsick to hunt for corpses. All of these birds died horribly, and in the same way."

Huckins concluded her letter by imploring that spraying poisons from the air should stop until all evidence of the impacts on both wildlife and humans were known. "Air spraying where it is not needed or wanted is inhuman, undemocratic, and probably unconstitutional," she stated. "For those of us who stand helplessly on the tortured earth, it is intolerable."

Broader mass spraying was being planned next, so Huckins' letter to Carson was not only an informative description of the lethal spraying in her own backyard but also an appeal for help. In October 1962, just one month after the release of *Silent Spring*, Rachel Carson wrote to Olga Huckins, referring to an article in *The New York Times* that featured an interview with Stuart and Olga Huckins.

"I am happy to have this account of the origins of *Silent Spring* told," Carson wrote, "not only because you deserve the credit (or blame according to your point of view) for having brought back to my attention this problem. I think even you have forgotten, however, that it was not just the copy of your letter to the newspaper but your personal letter to me that started it all. In it you told what had hap-

pened and your feeling about the prospect of a new and bigger spraying and begged me to find someone in Washington who could help."

Huckins was grateful that the "someone" turned out to be Rachel Carson herself. And much of what the author reported in the chapter "And No Birds Sing" mirrored Huckins' alarming observations. For example, after aer-



Common yellowthroat

ial DDT spraying a woman in Michigan reported “12 robins lying dead in her lawn as she spoke.” In many states the sentiment was the same. A woman in Wisconsin inquired, “Can anyone imagine anything so cheerless and dreary as a springtime without a robin’s song?”

Thanks to the success of Carson’s book and the widespread education it provided, sweeping changes occurred that benefited the whole country as well as the Huckins’ beloved little bastion for birds in a small town in Massachusetts.

For many years the peaceful world on Powder Point remained much as it had been, a destination for birds as well as birders. It was in keeping with the spirit of the Huckins, who, according to Bob Hale, “were perfectly willing to let people birdwatch on the property.” David Clapp, who frequented the “secret spot” with his weekly birding group, says “the pond often had night-herons, green herons, and occasionally spotted sandpipers in its trees and along the shore.” Other common sightings were songbirds such as Carolina wrens, red-winged blackbirds, white-throated sparrows, and American goldfinches.

However, as is so often the case, a new threat to the Huckins’ former property came in the form of development pressure. The value of the land from a real-estate perspective skyrocketed in recent years, and a section of the property came up for sale. Fortunately, recognizing the sites’ historical, aesthetic, and ecological value, a conservation-minded couple, Judi and Terry Vose, purchased 1.1 acres of the original sanctuary, including the pond and wetlands, and a cottage that they named The Spring House. If not for the Vose’s resolve, the paradise for wildlife on Powder Point might have been obliterated and become a sterile suburban “landscape.”

“Olga Huckins referred to the property as her bird sanctuary,” says Judi Vose. “I feel grateful that we are going to be stewards of this parcel that inspired Rachel Carson. We want to keep it as natural as possible and bring back more native plants.”

The Voses are preserving the site as a sanctuary to honor Rachel Carson, as well as her friend Olga Huckins. “I admire them because they fought for nature and cared for our one and only home,” says Judi Vose. The “secret spot” is indeed still beautiful, with mature cedars and oaks as well as wet areas that are a draw for birds. A recent list of migrants and summer residents included the magnolia warbler, blackpoll warbler, common yellowthroat, red-eyed vireo, and great crested flycatcher, to name a few.

On Rachel Carson’s birthday May 27, from 10 a.m. to 2 p.m.— the Voses have an event planned at The Spring House and bird sanctuary. A Tribute to *Silent Spring* on its 50th Anniversary is free and open to the public. All are welcome to attend, enjoy bird walks at the site, and listen to a distinguished panel of speakers. For more information, email: copperfarm@comcast.net. In conjunction with this event, the Cinema at Plimoth Plantation will present *A Sense of Wonder*, an hour-long film about Rachel

The “secret spot” is indeed still beautiful, with mature cedars and oaks as well as wet areas that are a draw for birds.

Carson, her love for the natural world, and her fight to protect it. “You cannot walk away unmoved,” says Bill Moyers. Go to www.plimouth.org for details.

As with the rest of the nation, at the time of the publishing of *Silent Spring*, which was considered controversial by some, there apparently was some negative reaction in Duxbury. Olga Huckins had to respond: “Where is there a better place to achieve a rare balance of nature, except in a garden that is not poisoned by lead arsenates, DDT and all the horrors of the age?”

she wrote in the *Duxbury Clipper*. “In our garden, skunks and starlings eat all the larvae and grubs of predators; ladybugs remove the aphids from roses; all birds sing, with thrushes making the evening and early morning golden with their songs.”

Ann Prince is associate editor of Sanctuary.

Of Kestrels, Meadowlarks, and Polybrominated Diphenyl Ethers

What Would Rachel Do?

by Chris Leahy

It's not so much the unpleasant certainties that wake us at 3 a.m. but rather the dark mysteries—inexplicable bad things the causes of which seem likely to be even more disturbing.

For me, the most haunting revelations in the *State of the Birds* report that Mass Audubon published last fall are those phenomena for which we could offer little or

no conclusive explanation. The tale of those species we termed the “whisperers,” for example, is bound to make any thoughtful person a little uneasy. These are birds—northern flicker, eastern phoebe, and Baltimore oriole, for example—that are still fairly common and widespread but have declined gradually, steadily, and ever more steeply over the last 45 years.

Yet, troubling also are instances in which a sudden and steep decline in a common species' distribution and abundance seems to yield to a readily available explanation that on closer inspection proves to be inadequate. Two cases in point: American kestrel and eastern meadowlark. All but taken for granted as common roadside birds as late as the 1980s, the kestrel and meadowlark have populations that plummeted alarmingly within just a few decades throughout much of their range. Initially an obvious cause presented itself. These are birds of agricultural habitats, and everyone knows that farmland in New England is fast becoming part of a historical landscape; surely these birds were classic victims of habitat loss. But birdwatchers who pay close attention to their local patches of habitat noted that kestrels and meadowlarks are now absent from places where they were recently common—even though the critical elements of their habitat were still amply present.

Could it be that some pervasive environmental factor is decimating broad segments of the avifauna by, say, depressing insect populations? An estimated 74 percent of the diet of both kestrels and meadowlarks con-



American kestrel

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Wood thrush

sists of insects. Most of the whisperers feed mainly on insects. A dearth of insects would also explain the decline in the so-called “aerial insectivores”—swifts, nightjars, swallows, and flycatchers—almost all of which are becoming both less numerous and more restricted in distribution. What might such a broad-spectrum factor be?

Rachel Carson might have had an educated guess.

The great triumph of Carson’s *Silent Spring*—the awakening of the public mind to the potentially devastating effects of pesticides on birdlife and by extension on people and the consequent banning of DDT in the US in 1972—can be seen in retrospect as giving cover to the very problem that it so eloquently exposed.

Many Americans today assume that Rachel Carson and the wise legislators of the Nixon administration solved the problem. DDT disappeared from our garden center shelves, our agricultural practices, and our pest-control programs. Never again would the public be at risk of poisoning from toxic chemicals in their air, food,

and water supply. Surely chemical manufacturers were now restrained by the most rigorous government standards from producing such dangerous substances and selling them to a trusting public. In actuality, all of this is a monumental delusion. Consider the following annals of environmental toxicology since 1972.

Naming Our Poisons. Far from reducing the quantities of pesticides we use following the wake-up call of *Silent Spring*, we now use far more of these chemicals than in 1972. We apply an estimated 5 billion pounds of pesticides a year on our agricultural fields, golf courses, and yards; 20 percent of this total (1.2 billion pounds) is used in the US.

Anticipating the banning of the organochlorine family of synthetic pesticides, the chemical industry set about developing alternatives. The resulting organophosphate and carbonate pesticides had the advantage of being less persistent in the environment than their predecessors but proved to be far more toxic in very small



Great horned owl on nest

amounts. The US Fish and Wildlife Service estimates that 672 million birds are exposed to these substances annually in the US in farmland alone, killing at least 10 percent (67 million) outright. Because many deaths of small songbirds go undetected, some scientists believe that this mortality estimate may be significantly lower than the actual number.

The lawn care industry, which depends heavily on pesticides, has boomed in recent decades. This means that organophosphates that are acutely toxic to people as well as birds and other wildlife are increasingly prevalent in domestic settings. For example, 10 million pounds of the lawn care pesticide diazinon is used annually in the US, and it is responsible for more than 150 documented bird kill incidents (doubtless a fraction of the real total), claiming the lives of as many as 70 birds in one episode.

Arguably the scariest of the humanmade noxious substances we've let loose upon the planet are the perfluorochemicals, or PFCs. These are chains of carbon atoms to which fluorine atoms are strongly bonded, making them essentially indestructible. Used in products such as Scotchgard and Teflon, they are now detectable worldwide in air, water, food, and animal tissues. Once thought to be biologically inert, PFCs are now known to

be highly toxic and because of their persistence have been characterized as the most notorious contaminants ever produced.

Unfortunately, that is not all.

Space limitations permit only a passing mention of varieties of organobromines, such as PBDEs and deca-BDE, developed as flame retardants and used in, well, everything: electronics, cars, furnishings, plastics, textiles, etc. Then there are PPCPs (Pharmaceuticals and Personal Care Products), including many over-the-counter drugs, synthetic hormones, and other endocrine-disrupting chemicals that survive sewage treatment and are discharged into water bodies where they have been shown to adversely affect reproduction in fish. Possible impacts on human health are under investigation.

What Poisons Do to Birds—and Us. We are still trying to understand the full implications for ecosystems and human health of the near-universal presence of many of these synthetic chemical compounds. We know that at least 40 active ingredients in readily available pesticides are lethal to birds even when used as recommended on the label. Scientists have also documented “sub-



© BARRY VAN DUSEN

Savannah sparrow

lethal” effects of chemical poisoning in birds such as an inability to form hard eggshells, deformed embryos, weight loss, hormonal dysfunction, disorientation during migration, nerve damage, and decreases in energy manifested in reduced parental attentiveness and critical behaviors such as feeding and flying.

The term “sublethal” to describe these effects is somewhat misleading since all may eventually lead to death and/or the decline of a species’ population. Of course, birds are not people, and we still have much to learn about atmospheric toxins, but it would be irresponsible not to apply the canary in the coal mine analogy and wonder how much of the striking recent spikes in human health issues such as cancers, sterility, hormonal disruptions, and immune system disorders might be related to playing with chemical fire.

How Bad Is It? Hard to say. Due to the difficulty of counting the number of birds that drop dead in a forest or field or over the ocean and the problem of making a direct link between a bird’s demise and the toxic substances it may have consumed on your lawn or elsewhere, it is difficult to estimate how big a mess we’ve gotten ourselves into. But a 2007 study by the Biodiversity Research Institute in Gorham, Maine, certainly provides cause for concern. The institute analyzed samples from the eggs of 23 species of birds in many different families and from many different habitats and detected the presence of over 100 potentially toxic substances, in some cases at levels judged to be harmful to the birds’ organs, nervous and immune systems, and their ability to reproduce.

What Can Be Done? The Internet is replete with suggestions for homeowners on reducing pesticides in the environment. But, while it is true that American households spend millions on pesticides and use them promiscuously (in amounts averaging 10 times more per acre than farmers use on their fields), most of the “remedies” (plant native species, attract insect-eating birds to your yard, choose the safest chemicals), though wholesome in their own right, do not begin to address the scope of the problem. The truth is that production and sale of the atmospheric poisons described above should be far more strictly regulated by federal law and the resources to enforce the regulations increased significantly. But pressure

from chemical industry lobbyists and the current widespread animosity toward government regulation and environmental protection effectively inhibit the EPA and other relevant agencies from doing their jobs.

Rachel Carson’s great achievement was to sound a wake-up call that rang more loudly of truth in the public’s ears than the prevarications of the industries that make and sell these substances and their political supporters. The threat—to birds and people—from human-made atmospheric pollutants is far greater than it was in Rachel Carson’s time. But there will be no change until an awakened public demands it.

Chris Leahy holds the Gerard A. Bertrand Chair of Natural History and Field Ornithology at Mass Audubon.

Aftershocks

The Reaction to Silent Spring

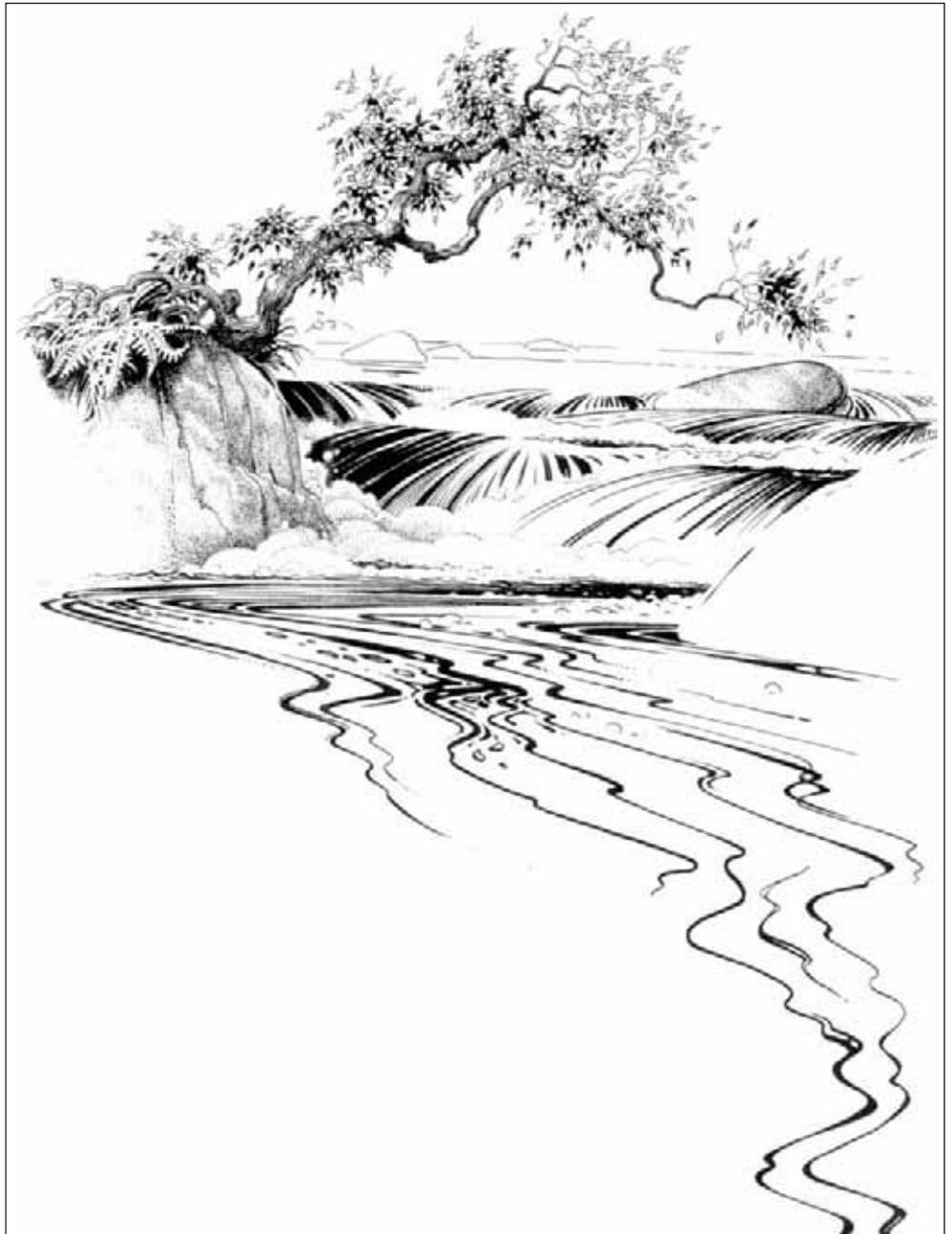
by Thomas Conuel

Outraged voices; sneering challenges; condescending nicknames; a refusal to believe scientific evidence gathered and researched over years pointing to dangerous trends damaging the natural world and threatening human populations. The findings are accepted by the scientific community with alarm, but others, mostly big industries backed by well-oiled public relations firms, react with high-decibel opposition. They question the validity of the overwhelming scientific evidence that supports the claims. They fire off barrages of personal aspersions against the messengers delivering the bad news.

No, the above is not the current crop of political candidates and naysayers prowling the land who deny the validity of climate change and question the painstaking science behind the conclusions that greenhouse gases are warming the planet to a dangerous degree. Instead, the outcry was part of the reaction and attacks directed against a quiet scientist who fifty years ago, after meticulous research, warned that we were poisoning our environment with dangerous chemicals and we must stop or face grave consequences.

In nature nothing exists alone. We are all part of the great chain of life, and poisons in the environment will eventually find their way into ecosystems and eventually our own bodies. That was the simple core message that Rachel Carson delivered in the book *Silent Spring*, a publication that many consider the most important book of the twentieth century. But in spite of the classic's popularity, a bellicose minority scoffed at its scientific findings and to this day curse the author for helping to jump-start the environmental movement.

Rachel Carson backed her findings with careful research distilled from multiple sources. A detailed "List of Principal Sources" (54 pages in the third edition of *Silent Spring*, 1962) cites all manner of scientific data, expert opinions, and research papers (i.e., "Liver Flukes in Cattle," U.S. Dept. of Agriculture, Leaflet No. 493) as building blocks supporting her premise. But no matter. As with today's climate change deniers, the opposition



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to *Silent Spring* came mostly from industry-backed mouthpieces who refused to acknowledge scientific fact.

As Paul Brooks detailed in *The House of Life*, his literary biography of Rachel Carson, the opening salvos against *Silent Spring* came almost immediately after its serialization in *The New Yorker* beginning June 16, 1962, from “a relatively small (though very rich) segment of society, the chemical and related industries (such as food-processing), and—in the federal government—the immensely powerful Department of Agriculture.” At the heart of the bitter attacks against Rachel Carson, Brooks wrote, was this: “She was questioning not only the indiscriminate use of poisons but the basic irresponsibility of an industrialized, technological society toward the natural world. She refused to accept the premise that damage to nature was the inevitable cost of ‘progress.’”

Her opponents launched a two-pronged attack against her. First came the attempts to intimidate her publisher and suppress sales of the book. Since its serialization in *The New Yorker*, *Silent Spring* had been the subject of over 70 newspaper editorials and commentaries, many laudatory but shocked. The Velsicol Chemical Corporation launched the fight to suppress the book by claiming that it contained inaccurate accusations against one of its products, chlordane, a now-banned pesticide. They threatened to sue the publisher, but when Houghton Mifflin refused to back down the threatened lawsuit vaporized.

Silent Spring became an immediate bestseller, spending 31 weeks on *The New York Times* list and confounding the initial strategy launched by its opponents to prevent publication and widespread discus-

sion of its shocking conclusions. So quickly did the book become a central topic that *The New York Times* ran a headline above a story: “*Silent Spring* is Now Noisy Summer.”

Discrediting the book and its author, her research and findings, and her motives became the next strategy. As John Hanson Mitchell points out in his introductory essay here in *Sanctuary*, Rachel Carson was subjected to a torrent of abuse, condescension, and name-calling intended to misrepresent her diamond-hard scientific facts as misty hysterical speculation from “the nun of nature.” Though Carson was a highly trained scientist and well-known author, critics focused on spreading innuendo regarding her personal life—she was an unmarried woman, a spinster, a bird lover, a cat lover, an odd duck. But that type of belittlement didn’t work either, proving the old adage from Shakespeare’s *The Merchant of Venice*, “but at the length truth will out.”

The next salvo against the book came from the National Agricultural Chemicals Association, which got right to work producing a booklet, “Fact and Fancy,” which attempted to refute Rachel Carson’s research and analysis. Monsanto Chemical Corporation, a giant in the industry, tried a stab at parody with a lame publication, *The Desolate Year*, describing a world without pesticides, dominated by hyperactive predatory insects and raising the specter of malaria, yellow fever, sleeping sickness, and typhus rampant across the land.

Brooks noted that many of the most virulent attacks against Rachel Carson came from agricultural journals and state institutions whose research was heavily funded by the chemical industry. In one particularly blatant distortion, a fable for the future in the *American Agriculturist* presented a grandfather and a young boy desolate and alone and reduced to eating acorns in the woods. The rest of the family had died from malaria caused by mosquitoes or had starved due to swarms of grasshoppers and other insects eating the crops—all because a book called *Quiet Summer* led some fools to believe that no chemicals should be used in agriculture (a total misreading of *Silent Spring*).

TIME magazine joined in condemning the book, calling it emotional and inaccurate. *Reader’s Digest* piled on, canceling a planned condensation of *Silent Spring*. *The Saturday Evening Post* labeled the book alarmist and assured readers that their world was not being poisoned. There were organized letter-writing campaigns flailing Rachel Carson with invective-filled comments. *The New Yorker* took numerous broadsides for the sin of first publishing her findings.

As one, only slightly extremist, letter read:

“Miss Rachel Carson’s reference to the selfishness of insecticide manufacturers probably reflects her Communist sympathies like a lot of our writers these days.

“We can live without birds and animals, but, as the current market slump shows, we cannot live without business.

“As for insects, isn’t it just like a woman to be scared to death of a few little bugs! As long as we have the H-bomb everything will be O.K.”

H. Davidson—San Francisco

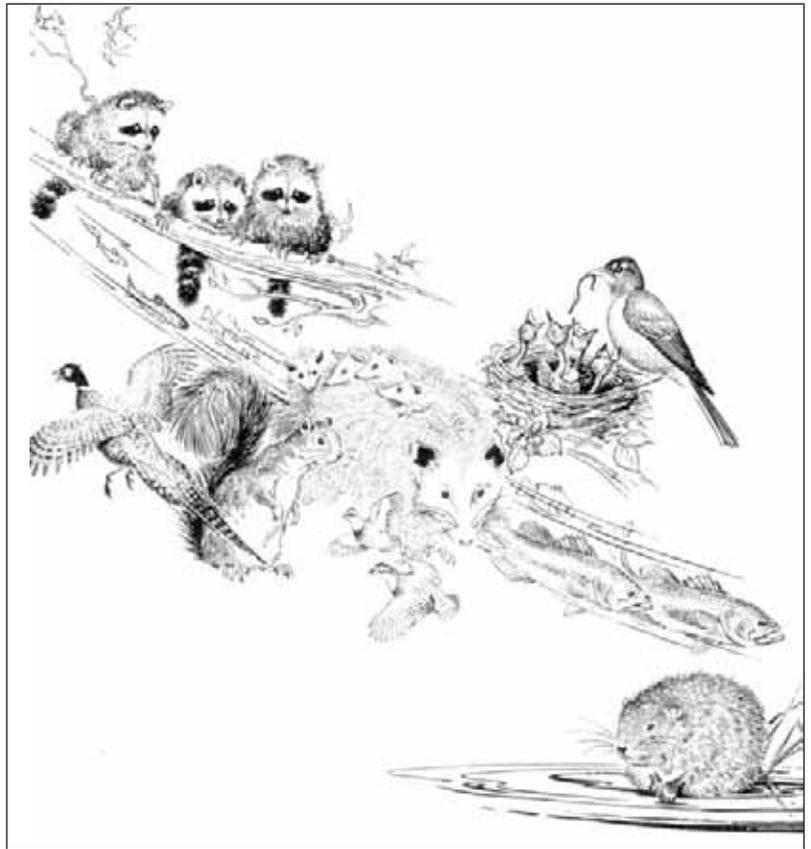
But for all the wrong-headed opposition, *Silent Spring* brought a flood of positive responses as well as awareness and change. President Kennedy ordered a study of the DDT controversy caused by the book, and the report that followed from the President’s Science Advisory Committee validated and thanked Rachel Carson for raising awareness of the toxicity of pesticides. “No one could any longer deny that the problem existed; the question now was what we were willing to do about it,” noted Paul Brooks.

Rachel Carson appeared before a Senate Committee on environmental hazards in June 1963, and two days later she testified before the Senate Committee on Commerce. Secretary of the Interior Stewart Udall quickly became a powerful ally in the fight to regulate pesticides.

Silent Spring caused controversy and discussion overseas. In England, members of Parliament wrangled over its findings and how to protect the English countryside. The book was published in France, Germany, Italy, Denmark, Sweden, Norway, Finland, Holland, Spain, Brazil, Japan, Iceland, Portugal, and Israel and galvanized nations into action against indiscriminate use of pesticides.

When Rachel Carson died at age 56 on April 14, 1964, two years after the publication of *Silent Spring*, reaction to her death mirrored the emotions unleashed by the book. In the final years of her life, Rachel Carson received numerous letters of support from readers, which she treasured, as well as a slew of honors and awards. The Isaak Walton League of America cited her work; she received the Conservationist of the Year award from the National Wildlife Federation, and the Audubon Medal from the National Audubon Society; she was elected into the prestigious American Academy of Arts and Letters; and, perhaps for her the best award was the Schweitzer Medal of the Animal Welfare Institute, named after Albert Schweitzer, the humanitarian, missionary, and doctor whose philosophy of reverence for life inspired Rachel Carson and to whom *Silent Spring* is dedicated.

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Silent Spring generated local and national organizations dedicated to a clean environment including the Natural Resources Defense Council, the Wilderness Society, and the Environmental Defense Fund—all influenced, at least partially, by Rachel Carson. The Environmental Protection Agency, created in 1970, sprang from concerns raised by *Silent Spring* in 1962.

When she died of complications from breast cancer at her home in Silver Spring, Maryland, after a long struggle against the illness, opponents put forth the story that the only reason she had written about chemicals damaging the natural world was because of her own health problems, which was yet another untruth. Rachel Carson began work on *Silent Spring* in 1958, two years before her cancer diagnosis. She was a writer not afraid to take on a difficult and troubling subject, and in the end delivered a message that changed the world for the better.

Perhaps the lesson here is that there will always be a credulous minority who will not accept the validity of scientific research. But those who struggle on to protect the environment should consider Rachel Carson’s acknowledgement in *Silent Spring* “to a host of people...who are even now fighting the thousands of small battles that in the end will bring victory for sanity and common sense in our accommodation to the world that surrounds us.”

Thomas Conuel is a field editor for Sanctuary magazine.

The Way They Were

The state of the birds, past and present

by Wayne Petersen



Rose-breasted grosbeak

In 2009 the U.S. Department of the Interior released a comprehensive report called *The State of the Birds, United States of America, 2009*. This avian report card offered a continental perspective on the present status and health of North American bird populations. As with many report cards, the document contained both good and bad news: some bird groups received high marks and others less so.

Because the report focused on the status of bird populations at the continent and biome level, it was difficult to accurately decipher events on a more local scale. Accordingly, Mass Audubon recently completed its own *State of the Birds* report to portray the current status of birds in Massachusetts. Because *Sanctuary* has dedicated this issue to the influence of Rachel Carson's *Silent*

Spring on the environmental community at the time it was released in 1962, one is tempted to contemplate what bird populations were like at the time this landmark book was published.

I can vividly remember as a young person growing up in suburban eastern Massachusetts in the early 1960s, seeing bobolinks in spring and hearing eastern meadowlarks from my bedroom window. By contrast, and I am certain, I never saw a tufted titmouse, Carolina wren, or northern cardinal at my bird feeder. To this day I can recollect the red letter day when I first encountered hooded mergansers on the Charles River, and I recall the thrill, in 1958, of catching a rare glimpse of a red-bellied woodpecker that was visiting a local bird feeder. (This was only three years after the publication

of Ludlow Griscom and Dorothy Snyder's *The Birds of Massachusetts* in which they described this species as a "rare vagrant from the south.") Few and far between were my sightings of a Cooper's hawk in those days. The common raven was a species one had to go to Maine to see, and there were certainly no Canada geese grazing on my community's athletic fields nor any wild turkeys foraging on lawns anywhere in town.

During my wide-ranging perambulations on foot as a young person, I routinely encountered ring-necked pheasants in local fields, spotting a ruffed grouse was simply a matter of spending time in appropriate habitat, and hearing the buzzy song of a golden-winged warbler was practically a rite of spring if you knew where to look. These bird populations were markedly different when Rachael Carson crafted *Silent Spring* than those reported in Mass Audubon's *State of the Birds* summation in 2011.

For context it is relevant to highlight some of the events taking place in the aftermath of World War II when a number of things occurred that would forever impact bird populations, not just in Massachusetts but in many areas throughout the United States. Although the DDT story has been compellingly related in *Silent*

Spring, other environmental events have been less prominently articulated. In the late 1940s and early 1950s, following nearly seven years of international conflict, thousands of American soldiers returned from the European and Pacific campaigns—many in need of affordable housing and related services. This reality translated to landscape development on a grand scale—a scale that would permanently usurp or fragment vast acreages of previously undisturbed open space in Massachusetts and beyond.

Concurrently, many thousands of acres of abandoned farmland and early-successional landscapes were gradually succeeding to secondary forest, a process still continuing in many areas of rural Massachusetts. Upland game bird and waterfowl hunting was more popular in the 1950s and 1960s than it is today, and the widespread and pernicious effects to birds created by a landscape bristling with towers, turbines, and super-tall lighted structures were not as prevalent. But perhaps most importantly, concern over declining migratory bird populations had barely come on to the radar screen of bird conservationists in the 1960s.

For example, the impact to birds resulting from habitat destruction in the Neotropics had not been recog-

Hooded merganser



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Black-crowned night-heron

nized as a concern at the time Rachael Carson was alerting the public to the ills created by the pesticide industry. In fact, declines in bird populations were hardly foremost in the minds of ornithologists of the day. Though the Christmas Bird Count (CBC) had been in place for 62 years when *Silent Spring* was released, the total number of these local annual bird surveys was a fraction of what it is today. Wildlife biologist Chandler Robbins had not conceived of the Breeding Bird Survey (BBS) in 1962, and the first statewide efforts to carefully document breeding birds in North America were not attempted until Mass Audubon's *Breeding Bird Atlas* was initiated in 1974. Clearly, there were plenty of unknowns surrounding the status and trends of Massachusetts bird populations in the 1960s.

With this background in mind, it is interesting to consider how Rachel Carson in her time might have characterized the current *State of the Birds* reports. Because few long-term databases existed in the 1950s and 1960s (no BBS or breeding bird atlases), or else were less com-

plete than they are today (e.g., CBC), it would have been scientifically challenging for her to accurately document the status of birds and the changes and variations in their populations. For some species, however, the task would have been straightforward. Many waterfowl were far less common back then than they are today, largely because in the mid-twentieth century a number of species were still recovering from many decades of over-hunting, despite the fact that during the same period there was a tremendous effort being made to increase waterfowl populations by expanding the network of national wildlife refuges throughout North America.

Today there is also greater understanding of waterfowl management techniques than was the case prior to the 1960s. Wood ducks, and those then-scarce handsome hooded mergansers that I first observed nearly half a century ago, have increased dramatically in the last fifty years, partly due to the extensive erection of nest boxes, and also because the return of beavers to many areas has resulted in an increase in suitable wetlands

required by these species for nesting. Now these same beaver ponds also support a burgeoning population of great blue herons, a species that did not nest in Massachusetts until 1925 and has subsequently increased from 55 to 348 occupied breeding bird atlas blocks in the interval between 1979 and 2011.

Wetland birds would have been unlikely to raise any alarm in Carson's era, yet the pied-billed grebe, American bittern, and common moorhen are all currently state listed by the Massachusetts Natural Heritage and Endangered Species Program. While scarcely considered habitats of concern in the 1960s, freshwater wetlands in the Commonwealth have been significantly reduced in extent and in many locations are choked considerably by invasive wetland plants.

The status of the state's raptors over a half-century ago is one situation with which populations would have differed dramatically from the present day. The pesticide saga told in *Silent Spring* offered clear linkage between organochlorine pesticides such as DDT and the

precipitous decline of fish-eating species such as the osprey and bald eagle following World War II. Even the iconic peregrine falcon was virtually extirpated as a breeding species in the Northeast at the time that Rachel Carson wrote *Silent Spring*. During that same period even the widespread red-tailed and Cooper's hawks were far less common than they are presently, in part due to land use patterns and an increase in forest habitat since then. These species along with the magnificent peregrine falcon have now readily taken to nesting in suburban and urban areas.

Shorebirds in Carson's day were still recovering from heavy market gunning less than a century earlier, and species like the American oystercatcher and willet had yet to reclaim their historic nesting sites in Massachusetts. The status of gulls and terns was slightly different. The herring gull was rapidly approaching a population zenith in the 1960s, with the great black-backed gull not far behind. At the same time an estimated 7,500 pairs of roseate terns nesting in the



© JOHN HARRISON

Eastern towhee

Commonwealth in 1940 had been reduced to about 1,500 pairs by the 1970s, primarily in response to the expanding gull population. Today, the trends for these species indicate a continued decline in roseate tern numbers, and BBS data suggest that the herring gull may also be declining on the national front.

Perhaps foremost among the birds described in Mass Audubon's current *State of the Birds* report that would have been unlikely to appear in a comparable effort in Rachel Carson's time are many southern species with breeding ranges that are expanding northward, including a number of species of first-time nesters since the 1960s. The list is long and varied and the selection that follows reads like a Southern who's who?: tricolored heron, glossy ibis, turkey vulture, Acadian flycatcher, fish crow, blue-gray gnatcatcher, northern mockingbird, blue-winged warbler, cerulean warbler, hooded warbler, and orchard oriole, to name a few.

During the same time period, most grassland, coastal heathland, and shrubland species declined precipitously. Some such as the short-eared owl, though never truly common in Massachusetts, were stable in the areas where it nested; however, now there are strong indications that it is declining in winter as well. Other species such as the northern bobwhite, upland sandpiper, eastern whip-poor-will, horned lark, brown thrasher, golden-winged and chestnut-sided warbler, eastern towhee, eastern meadowlark, and field, vesper, and grasshopper sparrow were once relatively widespread and locally common in suitable habitats in Carson's time. Today, the loss of these specialized habitats due to increased fire suppression, spread of human development, and natural forest succession has caused many of these species to be at greater risk than practically any other group of birds in Massachusetts.

In addition to habitat preference, another commonality among these species is that all of them either nest on the ground or else in close proximity to the ground. Mass Audubon's analysis suggests that species sharing this behavior may be especially vulnerable to predation from domestic cats, coyotes, foxes, raccoons, and skunks, all of which have increased significantly with the spread of suburban development and the associated fragmentation of habitat.

Parallel to this is the increase shown by many Massachusetts forest breeders such as the eastern



© DAVID LARSON

Female Canada warbler

screech-owl, pileated woodpecker, hermit thrush, worm-eating warbler, and ovenbird since the first *Breeding Bird Atlas* was conducted in the 1970s. No doubt these increases would be even more profound if they could be compared with their status in the mid-twentieth century when forest cover was not nearly as extensive as it is currently.

A final phenomenon largely unrecognized by Rachel Carson, yet now increasingly determined to be responsible for affecting the present and future distribution and abundance of birds in Massachusetts, is climate change. As global temperatures continue to increase, changes in forest composition are projected to change as well. Much of the future forest cover of Massachusetts is predicted to become oak and pine at the same time that northern hardwood forests and higher elevation spruce and fir forests in western Massachusetts gradually shift northward. Correspondingly, northern species such as the olive-sided flycatcher, blackpoll warbler, and white-throated sparrow will likely continue to decrease even as populations of the black vulture, yellow-billed cuckoo, and orchard oriole increase.

Given some of these differences, were Rachel Carson with us now, one wonders whether the predicted changes in global temperature, sea-level rise, and continental forest cover would spark the same reaction as her concerns over the pesticide industry did in the 1960s? In fact, as some have suggested, what we need in our time is an earthshaking work such as *Silent Spring*, establishing once and for all the devastating environmental effects of climate change.

Wayne Petersen is director of the Important Bird Areas program for Mass Audubon.

The True Cost Considered

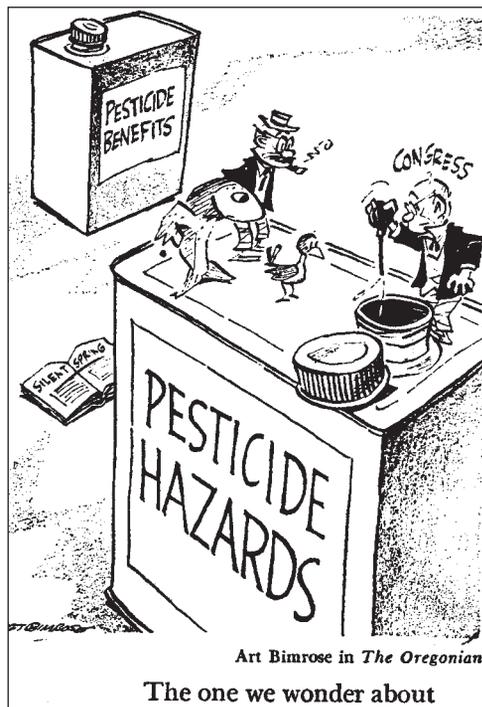
by Jennifer Ryan

Rachel Carson, through her evocatively entitled book *Silent Spring*, is credited with launching the environmental movement. She wrote elegantly about the balance of nature and the impact of pesticides on all species, not just those for which the pesticide was intended. She wrote about the shortsightedness of humankind, manifested in our desire for an easy fix through pesticides, and she attempted to move us to action in the face of a complex challenge.

We now face another worldwide environmental issue, and it has been said that we need another *Silent Spring* to face up to it. The issue is climate change.

Al Gore himself credits Rachel Carson with developing his awareness of the interdependence of the living world, and his *An Inconvenient Truth* certainly educated many on the perils of a rapidly changing climate. But times are different today; *An Inconvenient Truth* was authored by a politician in an increasingly polarized political climate, and the evils of government are driving the debate. The titles of the two books speak volumes: Gore's says we know the truth but don't want to step up; Carson's warns us that we may lose something real while remaining in denial and need to step up.

Fossil fuels, and the destruction and reduction of the natural world by humans for the energy they provide, is analogous to pesticide use—the control of insects for economic gain calculated with simple parameters that leave out the true cost of impacts on human and ecological health regardless of what else might be lost. One of the greatest failings in our energy policies globally is that we don't factor in the true cost of fossil fuels—the environmental damage from mountaintop coal removal or oil spills, the poverty and human rights travesties, the wars for oil. To push back pesticide use we had a poster child, the symbol of American freedom, the bald eagle whose population was decimated by DDT contamination of its food source. For climate change, we have the polar bear swimming across the Arctic looking for a bit of ice to rest on to escape drowning at sea. It took time to reel in pesticide use in the United States, and even



now it is still prevalent. Furthermore, many of the most toxic pesticides, while not used in the United States, are still used in other countries as heavily as ever.

What is different is the scale of the threat—the seas are rising, the bread-baskets of the world are getting hotter and drier, the warmer temperatures allow disease-bearing insects to move north, and over a quarter of the earth's species may go extinct in the next 100 years. There are major environmental, economic, and human impacts predicted—and within a fairly short time frame.

The real challenge in understanding climate change is that there isn't a single target or suite of targets, even though carbon and other heat-trapping gases are the culprits. They are in fact emitted from such a vast array of sources, and their production and regu-

lation are tremendously complex.

To scale back Mass Audubon's carbon emissions, we have changed lightbulbs, installed solar arrays, updated our vehicle fleet, winterized our buildings, and switched to purchasing only clean power. Each of these practices is directed by its own set of laws and regulations. The federal government is trying to incentivize more efficient lightbulbs. Automobile gas efficiency is regulated by Corporate Average Fuel Economy (CAFE) standards. Solar arrays are driven by improved technologies, which are in part promoted by grants and tax incentives as well as government programs to fund solar panel installation and allow for selling of excess power to the grid, making financing easier.

But what we need are more people engaged in these complex issues, advocating beyond pesticides and wildlife conservation. We need better science and environmental science education to ensure that the next generation understands not only the beauty and interconnectedness of the natural world but also the interconnectedness of our own political constructs.

Jennifer Ryan is Mass Audubon's legislative director. She is also a conservation biologist.

Poetry

Edited by Susan Richmond

After a Mockingbird

by Robert Cording

At my open window—the lurching runs

Of mews and whistles, mechanical arias,
Whirligigs of a robin's snatched *cheerily, cheerily, cheerily.*

Too much, too much
Isn't music, but this mocking-
Bird will not get down from its high perch,

Will not quit calling out, *there's no milk, no milk, no milk;*
The car needs gas, the car needs gas;
Hurry, hurry, hurry; that tie? that tie? that tie?

Until the bird seems legion,
And mockingbirds look down
From the lilac's every branch, dismantling me

One moment at a time. Yet after
It flies off, no more than the briefest incarnation,

I step away from my desk,
From the hallway clock ticking off the silence,

And, at the window, sunlight shouts in the grass,
Irises guzzle clear blue air down their throats,
The lilac's purple honeycombs buzz with sweetness.

Robert Cording is the Barrett Professor of Creative Writing at College of the Holy Cross. He has published six poetry collections, most recently *Walking With Ruskin* (CavanKerry, 2010).

O Be

by Fred Marchant

driftwood logs at the base of a small waterfall
as it empties into the bay
water or time no matter to me the emanation steady
the inanimate indifferent
to the suffering it sees, a woman beyond weeping
her fingers scratching veins
on each opposing hand o where did I first see this?
those hands float in the mists
over the falls precarious in the roar white foam
gathering under a bridge
a place to stand and admire or as in giving yourself to
some places are just designed
for leaping everyone knows this and there are heights
so right and eager to please
the word inviting was invented to name the distance
between beginning and end and
top to bottom and here to the color of shade and
brown
water pouring each into each
a light that turns me now into a sparrow clinging
to a branch my black bead eyes
missing nothing wanting nothing more than the sound
of this
that is all I am, be patient lord O be

Fred Marchant is the author of four books of poetry, including *The Looking House* (2009). He directs the Creative Writing Program at Suffolk University.



Berkshire Sanctuaries is offering two events in conjunction with Berkshire Museum's exhibition—

Taking Flight: Audubon and the World of Birds

Lecture on the Life of John James Audubon at the Berkshire Museum in Pittsfield

by Mass Audubon Visual Arts Center Director Amy Montague

Friday, March 16, 7 p.m.

The life of iconic artist of American birds John James Audubon is even more dramatic than his volume of work. In Europe, he styled himself as "the American woodsman," wearing buckskins and bear grease, while in America he gained entry into drawing rooms of the wealthy through his European sophistication. Free. Call 413-443-7171 x13 for more information.

Members-only Trip to Mass Audubon's Visual Arts Center in Canton All-day Excursion on Saturday, March 24

Members of the Berkshire Museum and Mass Audubon are invited to travel by bus to the Visual Arts Center for a behind-the-scenes guided tour of one of the finest museum collections of American bird art, including engravings, paintings, decoys, and wood carvings. Works are by John James Audubon, Louis Agassiz Fuertes, Frank Benson, Charlie Harper, and Andy Warhol, to name a few. Call 413-443-7171 x13 for departure time, fee, and reservations.



Family Programs

BERKSHIRE SANCTUARIES

Lenox, 413-637-0320

Bat House Making Workshop

March 31—1:30-3 p.m.

Evening at the Beaver Ponds

April 9, May 9—6:30-8 p.m.

Bird Banding Demonstration

April 14—10 a.m.-noon

Wildflowers and Spring Changes

May 13—10 a.m.-12:30 p.m.

BLUE HILLS

Milton, 617-333-0690

Creepy Crawlies

March 31—1-2 p.m.

BOSTON NATURE CENTER

Mattapan, 617-983-8500

Under a Log

April 1—2-3:30 p.m.

BROAD MEADOW BROOK

Worcester, 508-753-6087

Mountain Laurels at Burncoat Pond

June 9—10 a.m.-noon

BROADMOOR

South Natick, 508-655-2296

Wild about Reptiles

April 1—1-2:30 p.m.

Frogs, Pollywogs, and Fairies

April 29—1-2:30 p.m.

Wild about Amphibians

May 19—1-2:30 p.m.

CONNECTICUT RIVER VALLEY

Easthampton, 413-584-3009

Big Night

March 31—5:30-9 p.m.

DRUMLIN FARM

Lincoln, 781-259-2206

Bringing Up Baby

April 27—3:30-5 p.m.

FELIX NECK

Edgartown, 508-627-4850

Vineyard Wildlife Festival

May 19—10 a.m.-2 p.m.

IPSWICH RIVER

Topsfield, 978-887-9264

It's Big Night!

April 13—6-8 p.m.

Audubon Nature Festival

June 3—10 a.m.-4 p.m.

JOPPA FLATS

Newburyport, 978-462-9998

Homeschool Classes

Cetaceans Study Session: April 12

Peabody Essex Museum Field Trip: April 26

A Visit to the Bird Banding Station: May 3

For children ages 7-11

VISUAL ARTS CENTER

Canton, 781-821-8853

Drawing Birds with Barry Van Dusen

March 24—10 a.m.-4 p.m.

WACHUSETT MEADOW

Princeton, 978-464-2712

Sheep Shearing Open House

April 14—1-4 p.m.

Rain date: April 15—1-4 p.m.

WELLFLEET BAY

South Wellfleet, 508-349-2615

Green Eggs & Sand Workshops

June 1-3

Call the individual sanctuaries for more information, fees, and to register.

Birding Programs

BERKSHIRE SANCTUARIES

Lenox, 413-637-0320

Bird Walks at Canoe Meadows

April 6, 13, 20, 27—8-10 a.m.
May 4, 11, 18, 25—7-9 a.m.

BLUE HILLS

Milton, 617-333-0690

Early-Morning Birding at Fowl Meadow

May 19—8:30-9:30 a.m.

BOSTON NATURE CENTER

Mattapan, 617-983-8500

Birding for Beginners

April 21—10 a.m.-11:30 a.m.

BROAD MEADOW BROOK

Worcester, 508-753-6087

Friday-Morning Birding

Every Friday in April and May—7-9 a.m.

BROADMOOR

South Natick, 508-655-2296

Wacky Woodcocks

March 30, April 3—7-8 p.m.

Mother's Day Birds and Breakfast Walk

May 13—walks start at 7, 8, 9, or 10 a.m.

CONNECTICUT RIVER VALLEY

Easthampton, 413-584-3009

Great Blue Herons

April 14—3-6 p.m.

IPSWICH RIVER

Topshfield, 978-887-9264

Birdwatcher's Getaway for the Day Series

March 16, April 20, May 25—times vary

Spring Migrants at Mt. Auburn Cemetery

May 10—6-11:30 a.m.

JOPPA FLATS

Newburyport, 978-462-9998

Wednesday-Morning Birding

Every Wednesday—9:30 a.m.-12:30 p.m.

Bird-a-thon Madness

May 12—8 a.m.-6 p.m.

SOUTH SHORE

Marshfield, 781-837-9400

Searching for Bobwhites

April 30—8 a.m.-noon

WACHUSETT MEADOW

Princeton, 978-464-2712

Bird-a-thon Birds and Breakfast

May 12—7:30-10:30 a.m.

WELLFLEET BAY

South Wellfleet, 508-349-2615

Spring Coastal Birding Field School

May 18-20

Birding North Monomoy & Nauset Marsh

Regular tours start in June

Call the individual sanctuaries for more information, fees, and to register.

For a full listing of Mass Audubon programs and events, visit our online catalog at www.massaudubon.org/programs.

6th ANNUAL STATEWIDE VOLUNTEER DAY



Saturday
April 28, 2012
9 am to noon

www.massaudubon.org/workforwildlife

Work for Wildlife at any one of these wildlife sanctuaries:

Berkshires

- Cance Meadows, Pittsfield

Cape Cod & the Islands

- Felix Neck, Edgartown
- Long Pasture, Barnstable
- Wellfleet Bay, Wellfleet

Connecticut River Valley

- Laughing Brook, Hampden

Greater Boston

- Boston Nature Center, Mattapan
- Blue Hills Trailside Museum, Milton
- Drumlum Farm, Lincoln
- Habitat, Belmont
- Visual Arts Center, Canton

North of Boston

- Ipswich River, Topshfield

South of Boston

- Allens Pond, Dartmouth
- Daniel Webster, Marshfield
- Moose Hill, Sharon
- Stony Brook, Norfolk

Visit the Gift Shop at Trailside

a Mass Audubon Store

Thursday-Sunday, 10 a.m.-5 p.m.

Blue Hills Trailside Museum
1904 Canton Avenue, Milton

Check out our new backyard birding section for seed, houses, accessories, and more

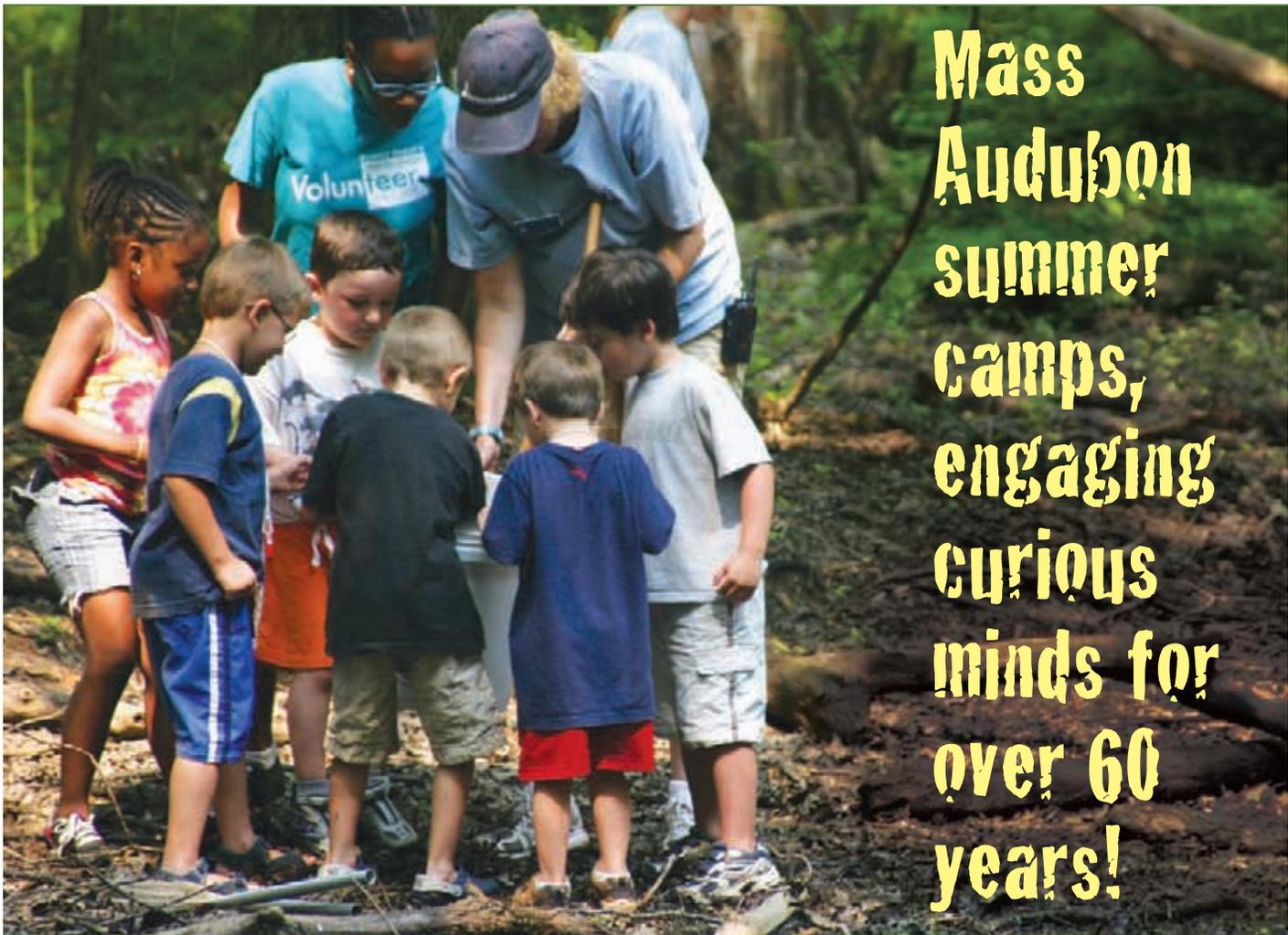
Member discount days on select items: May 17-20

Waterfront Cottage for Rent

Pierpont Meadow Wildlife Sanctuary in Dudley

Available late May through late September

Call 978-464-2712 for more information and availability.



**Mass
Audubon
summer
camps,
engaging
curious
minds for
over 60
years!**

**With 18 day camps from the Berkshires to the Cape and Islands,
and Wildwood, Mass Audubon's overnight camp**



there's something for everyone.

**Information on summer 2012 is now available on
our website www.massaudubon.org/camps.**

**Mass Audubon Camps are accredited by the American Camp Association.
The new Joppa Flats Day Camp and Urban Adventures Day Camp
will be seeking accreditation for summer 2013.**



SCHOOL VACATION WEEK PROGRAMS

BERKSHIRE SANCTUARIES

Lenox, 413-637-0320
Spring Stampede
April 17-20—10 a.m.-3 p.m.
 For children in grades K-2;
 preregistration required

BLUE HILLS

Milton, 617-333-0690
April School Vacation Week
April 16-20, 9 a.m.-3 p.m.

BOSTON NATURE CENTER

Mattapan, 617-983-8500
Spring Sleuths
April 17-20

BROAD MEADOW BROOK

Worcester, 508-753-6087
April Vacation Week
April 16-20—9 a.m.-3 p.m.

BROADMOOR

South Natick, 508-655-2296
April School Vacation Week
April 17-20—9 a.m.-3 p.m.

CONNECTICUT RIVER VALLEY

Easthampton, 413-584-3009
April Vacation Week
April 17, 18, 19, 20—9 a.m.-3 p.m.

Call the individual sanctuaries
 for more information,
 fees, and to register.
 For a full listing of Mass Audubon
 programs and events,
 visit our online catalog at
www.massaudubon.org/programs.

DRUMLIN FARM

Lincoln, 781-259-2206
April Vacation Week
April 16-20
 Full- and half-day programs for children in
 grades K-8; extended-day options available

HABITAT

Belmont, 617-489-5050
April School Vacation Week
 Up, Up and Away:
April 17—9 a.m. to 3:30 p.m.
 Sowing Seeds: *April 18—9 a.m. to 3:30 p.m.*
 Rotten and Stinking:
April 19—9 a.m. to 3:30 p.m.
 Wonderful Water:
April 20—9 a.m. to 3:30 p.m.
 For children in grades K-3
Adventurers
April 17-20
 For children in grades 4-6

IPSWICH RIVER

Topsfield, 978-887-9264
April School Vacation Week
April 17-20—9 a.m.-3 p.m.
 For children in grades K-5

JOPPA FLATS

Newburyport, 978-462-9998
April Vacation Flyby Programs
 Ponds and Pools: *April 17*
 Backyardology: *April 18*
 The River to the Sea: *April 19*
 For children ages 2-12
 accompanied by an adult

MOOSE HILL

Sharon, 781-784-5691
Science and Signs
April 16-20

VISUAL ARTS CENTER

Canton, 781-821-8853
Unique Wildlife
April 17-20

WACHUSETT MEADOW

Princeton, 978-464-2712
School Vacation Week
April 17-20, 9 a.m.-3 p.m.
 For children ages 5-11
**April Vacation Photography
 and Computer Camp**
April 17-20,—9 a.m.-3 p.m.
 For children ages 10 and up

WELLFLEET BAY

South Wellfleet, 508-349-2615
April Vacation Adventures
April 16-20

Save the Date



**Bird-a-thon 2012
 is coming...
 May 11-12**

© MARY DINEEN

Join us as we celebrate our 29th annual
 birding and fundraising extravaganza!

Thanks to your support and participation
 last year, we raised more than \$200,000
 for sanctuaries and programs across the
 state in just 24 hours. With your help,
 we will make 2012 the most successful
 Bird-a-thon yet!

To join a team, make a pledge, sponsor
 a birder, or learn more visit us at:
www.massaudubon.org/birdathon.



Spring 2012 Optics Sale

Members' special discount of 15%

March 31st-April 10th

A great selection of binoculars,
 spotting scopes, and accessories



Audubon Shop
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 Route 117, Lincoln, MA 01773

781-259-2214 Tuesday-Sunday, 10 a.m.-5 p.m.



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supporting conservation here and abroad

Travel with Mass Audubon Naturalists

Explore the world's most
natural regions with
Mass Audubon in 2012



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*Sandhill cranes in Bosque del Apache
National Wildlife Refuge, New Mexico*

INTERNATIONAL TOURS

Zambia: November 2012

New Zealand: October 28-November 14, with David Larson

Patagonia: January 2013

Columbia: February 2013

China: April 2013

Bhutan: April 2013

US TOURS

Birding the Rio Grande Valley and the South Texas Coast:

March 9-17, with René Laubach and Doug Williams
*For more information, contact Berkshire Sanctuaries
at 413-637-0320*

Birding the South Carolina Coastal Lowlands:

April 24-29, with Bill Gette and David Weaver
For more information, contact Joppa Flats at 978-462-9998

New Mexico—Rio Grande Lowlands to Rocky Mountain Highlands:

April 25-May 3, with René Laubach and Bob Speare
*For more information, contact Berkshire Sanctuaries
at 413-637-0320*

Sea Turtle Nesting in Florida:

May 2012

For more information, call Wellfleet Bay at 508-349-2615

Point Pelee and the Kirtland's Warbler—

Spring Migration Madness:

May 16-22

For more information, contact Drumlin Farm at 781-259-2206

Pacific Northwest Birding: June 4-15, with Wayne Petersen

Birding the Connecticut Lakes: June 8-10, with Bill Gette, Debra Listernick, and Nancy Soulette

For more information, contact Joppa Flats at 978-462-9998

Puffins and Peatlands: July 12-15, with Carol Decker and John Galluzzo

For more information, contact Ipswich River at 978-887-9264
Cosponsored by Ipswich River and South Shore Sanctuaries

Berkshire Blitz: July 25-27

*For more information, contact Broad Meadow Brook,
508-753-6087*

Women's White Mountains Adventure: July 26-28, with Berkley Cline and Carol Decker

For more information, contact Ipswich River at 978-887-9264

...and many more

For detailed itineraries: www.massaudubon.org/travel
travel@massaudubon.org 800-289-9504

Curious Naturalist

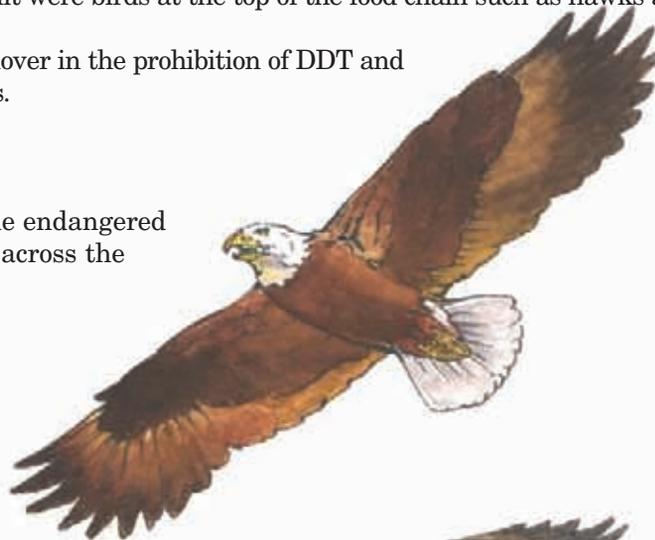
Saved by *Silent Spring*

Illustrated by Gordon Morrison

Huge numbers of various species of birds—ranging from warblers to bald eagles—were seriously threatened by the indiscriminate use of pesticides that began after the Second World War. Apart from outright poisonings, which affected many species of garden birds, DDT and other chlorinated hydrocarbon insecticides interfered with calcium production, resulting in thin eggshells that crushed easily. Adults failed to produce successful broods and year by year species declined. Especially hard-hit were birds at the top of the food chain such as hawks and eagles.

Rachel Carson's *Silent Spring* was the prime mover in the prohibition of DDT and other dangerous chemicals in the United States.

Bald Eagle: Formerly on the endangered species list; now flourishing across the nation.



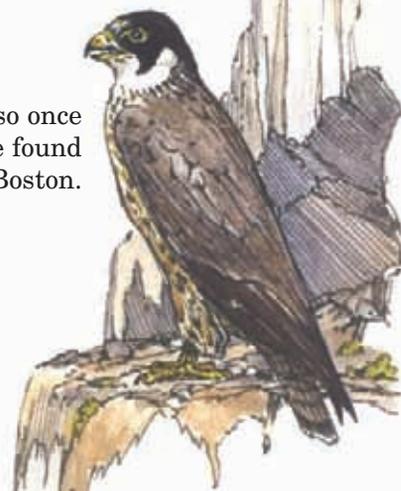
Brown Pelican: Common, but were formerly in serious decline from direct poisoning and thinning shells.



Osprey: These once-common fish hawks were seriously threatened by thinning eggshells. Over the past fifty years, they have made a significant comeback.



Peregrine Falcon: Also once endangered. Can now be found even in cities such as Boston.



American Robin: One of the most obvious of the affected birds. Robins died en masse in people's backyards.



Massachusetts
Audubon Society
South Great Road
Lincoln, MA 01773

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Outdoor Almanac Spring 2012



March 2012



March 20 Vernal equinox, first day of spring. Days and nights are equal length.

March 22 New moon.

March 23 Listen for the trill of song sparrows.

March 26 Phoebes and fox sparrows arrive about this time.



May 15 The height of spring warbler migration; listen for the dawn chorus and watch the treetops and shrubbery at dawn and dusk.

May 20 New moon.

May 21 Painted turtles and snapping turtles move onto land to lay their eggs.

May 25 Scarlet tanagers and rose-breasted grosbeaks return.

May 28 Dogwood blooms.

April 2012



April 3 Listen for spring peepers.

April 5 Field sparrows return.

April 6 Full moon. The Pink Moon.

April 10 Tree swallows return.

April 16 Look for white shadbush blossoms in woodlands.

April 21 New moon.

April 24 Listen for the trill of toads from nearby swamps and marshes.

April 29 Brown thrashers, towhees, house wrens, barn swallows, and chimney swifts return.



June 2012

June 4 Full moon. The Strawberry Moon.

June 9 Listen for the green frog chorus from freshwater marshes and ponds.

June 11 Field wildflowers begin to bloom about this date.

June 16 Sulphur butterflies emerge; fireflies appear in grassy areas.

June 19 New moon.

June 21 Summer solstice, longest day of the year.

June 23 Gray treefrogs begin singing; bullfrog chorus can be heard at night at nearby ponds.

June 30 Check your garden for robber flies, which hover in midair then zip off.

May 2012



May 6 Full moon. The Flower Moon.

May 8 Watch for trout lilies, columbine, trillium, and other woodland wildflowers before the trees leaf out.

May 10 Spring azure butterflies appear at forest edges and in gardens.



July 2012

July 3 Full moon. The Buck Moon.

July 8 Daylilies bloom along roadsides.

July 10 Watch for monarch butterflies on milkweed blooms.

