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Send all manuscripts and correspondence to the Editor; information for "Seasonal Field Notes" should be sent to the Associate Editor or the appropriate Field Note Compiler. Manuscripts that deal with information on birds in the State of Wisconsin, with ornithological topics of interest to WSO members, or with activities of the WSO will be considered for publication. All manuscripts submitted for possible publication should be typewritten, double-spaced, and on only one side of page-numbered typing paper. Illustrations should be submitted as photographs or good-quality drawings. Keep in mind that illustrations must remain legible when reduced to fit on a journal page. All English and scientific names of birds mentioned in manuscripts should follow *The A.O.U. Check-List of North American Birds (7th Edition)*. Use issues after Vol. 50, No. 1, 1988, as a general guide to style.

It's the (Unwritten) Law!

Certain activities are legal. Others are not. We grow up learning the difference between the two, and try to center our lives on what is right and what is wrong. There can be severe penalties when one errs on the wrong side of the law. Consequently, most people try to stay on the right side.

Most laws, such as those regulating speed limits or trespassing, are clearly defined. They involve signs or court orders or bills passed by government. Laws are official and are designed to be easily understood, to be black and white without any confusing gray areas.

Fortunately or unfortunately, laws aren't established for every activity in life. Take birding, for instance. No rules have been established for which binoculars can and can't be used. Field Guides? If you want to use Peterson, you can. If not, the National Geographic, Stokes, and Golden Guides are also fine.

But perhaps birding should be regulated because some birders are hurting birds, consciously or not. For example, there are certain occasions when tape recorders can be an effective tool and there are instances when they should be left at home. I will also suggest that birds, like humans, have thresholds for personal space and that these thresholds may vary from season to season. Overstaying your welcome in a bird's territory at the wrong time of year or leaving a scent trail too near a nest can lead to nest failure or worse.

I'm not going to get on a soapbox and tell you how to bird or how not to. What I am going to do is encourage you—no, urge you—to read the article in this issue of *The Passenger Pigeon* by WSO Conservation Chair, Dr. Noel Cutright, on the ethics of bird watching. I also recommend that you copy the article and send it to your children or bird watching friends for them to digest.

WSO has established a list of birding guidelines that is printed annually in the *Badger Birder*. Review this list each time it appears. Learn to avoid the seemingly innocent tactics used to shorten the distance between you and a bird that may in fact be devastating to the subjects you are enjoying through your binocs or camera lens. In time, through education and repetition, the birds and bird watching will both benefit from an ethical approach to our favorite endeavor.

Birds need our respect. Remember that just as speed limits, trespass laws, and financial regulations are society's ways of protecting our welfare, our birding methods should be carried out with the welfare of all our avifauna in mind.

President

Hermit Thrush *by Jack Bartholmai*

Attracting Birds Using Tapes or Compact Discs

by Noel J. Cutright

Most of us, at one time or another, have probably used a recorded bird song in an attempt to draw a bird closer for a better look. We all know that recordings should be used with care, but it is not always clear when it is okay to use a recording and when it is not. What is your response to each of the following hypothetical situations?

1. Badger Birder is participating on a Christmas Count. She has been told that playing an Eastern Screech-Owl recording in appropriate habitat should elicit responses from Black-capped Chickadees, White-breasted Nuthatches, Downy Woodpeckers, Dark-eyed Juncos, and several other winter species. Birds that hear the tape will fly closer and a more robust count of the number of individuals can be obtained, and maybe one of the more uncommon species might fly in to check out all the commotion and be counted. Should Badger play the screech-owl tape (Christmas Count rules do not specifically address tape use)? Should a different decision be made late in the day or during very cold weather? Is "pishing" any more or less acceptable than using a taped call?

2. Badger is leading an early June bird hike with 20 participants. In the rich deciduous woodland ahead, which is not routinely visited by birders, he can hear a Cerulean Warbler singing high in the treetops and a Hooded Warbler from a brushy gap left when a couple of large oaks were toppled by a storm. All of the participants can hear both species, but several express an interest in also seeing both birds. Badger knows that playing a tape of the songs of both species will likely cause these territorial males to fly closer to the group to investigate the source of the song. Should Badger play short bursts of the songs so everyone can see the birds? Two observers have trouble finding the birds among the leaves, and because neither has seen these species previously, they persist in asking him to replay the tapes. Should Badger acquiesce or politely decline and explain that he is reluctant to further disturb these uncommon Wisconsin species during the breeding season?

3. Badger is working on her Breeding Bird Atlas priority block and hears

a song that she believes is a Connecticut Warbler. After searching the thicket for 30 minutes, she still hasn't glimpsed the bird. Should Badger play the song of a Connecticut to bring it closer and confirm her identification? Would your response be different if a more common species was inserted for the Connecticut in this scenario?

4. Badger has heard that playing the tapes of the various rail songs will elicit a response from them if they are present in the marshes near where he lives. After he hears a Sora respond on his first attempt, he decides to visit the area frequently during May and June to learn more about rail usage of this wetland. Should Badger use a tape on every visit? How many repetitions should he make before he is either satisfied or gives up on a particular evening? Would your answer be different if Badger was a trained scientist gathering data on rail populations for conservation purposes?

5. Badger is told by a non-birding friend that a Yellow-breasted Chat was seen the previous day in a large clump of brambles at a nearby state wildlife area. She visits the area on two consecutive days without sighting the bird. On the third day, she plays the song of a chat and the bird immediately calls and sings from the thick cover and makes a brief appearance. Badger knows that chats are uncommon and that some birders will drive considerable distances to add the bird to their annual tally. Badger also knows that many of these birders will likely use their own tapes to increase their chances of seeing the bird. Should Badger report the bird to the state hotline, tell only a few close friends, or keep the information to herself? Would your response be different if the species was the state-endangered Yellow-throated Warbler or state-threatened Bell's Vireo? Would your response be different if another chat location was already known in the state and this was not the only site where they could be found?

6. Badger is participating with 10 other birders on an early June field trip. The trip is a productive one, and he is enjoying the birds and other birders. However, one birder seems to want to impress the others with how quickly he can find the song of a particular species on his new CD, and then plays the song incessantly while trying to draw the bird closer. Should Badger say something in an attempt to modify this bothersome behavior, or keep his mouth shut and enjoy the good looks at a couple of species he has seldom observed?

There is no single answer that is correct for every birder in all of these situations. However, the WSO has adopted a formal code of ethics that provides guidance on what constitutes acceptable behavior. The very first guideline states that "when birding, we should act in ways that do not endanger the welfare of birds and other wildlife." It further cautions us to "use recordings and similar methods of attracting birds sparingly, especially in heavily birded areas or known locations of individual birds."

Instances where excessive tape playing causes problems are not often recounted in print, but are circulated by word of mouth. It seems the effects of tape playing need considerable study as the number of birders continues to grow.

In the July 1997 issue of *Winging It,* the newsletter of the American Birding Association (ABA), the case of a Fan-

tailed Warbler that appeared at Arizona's famous Patagonia Roadside Rest is discussed. This note suggested that "the smattering of overly enthusiastic birders who pushed the bird with zealous tape-playing and too-close approaches were responsible for its presumed departure after just a few days." A birding tour leader recently told me that the Elegant Trogon is becoming more and more difficult to see in southeastern Arizona because of disturbances of their nest sites by enthusiastic birders and photographers.

It seems that organizations are discouraging tape playing more and more, especially for rails and owls in their breeding season, and this activity actually has been banned in Texas State Parks. You may think, "If I only play the tape for a little while, it won't hurt." But what if over 20 people played tapes for "just a little while" over a one-month period during the breeding season? Might not this severely disrupt any species' nesting?

Everyone who enjoys birds and birding has an obligation, at all times, to respect wildlife. As stated by the ABA as one of their principles of birding ethics, "In any conflict of interest between birds and birders, the welfare of the birds and their environment comes first."

You also may be wondering about using "pishing" or squeaking to attract birds. Intelligently and gently applied, these methods result in virtually no disadvantage to the bird being attracted. However, even this can be overdone for any one particular bird. Overexposure probably only serves to make the bird blasé and immune to further entreaties. Recordings of songs are more easily abused, particularly in the case of breeding birds.

The WSO does not intend to call for a ban on the use of recorded songs, but harassment of birds cannot be tolerated. For purposes of the U.S. Endangered Species Act (ESA), "harassment" constitutes an intentional or negligent act or omission that creates the likelihood of injury to wildlife by causing annoyance to an extent that significantly disrupts normal behavioral patterns that include, but are not limited to, breeding, feeding, or sheltering. Under Section 9 of the ESA, it is harassment, and therefore unlawful, to play a tape to attract a known Kirtland's Warbler. This carries over even to following years, so playing a tape at a site where a Kirtland's was found the previous year is also not allowed.

Our interactions with birds are a continuum, and the point at which we cross the harassment border is subtle and may be even more obvious to a bystander than to the birder. I have faith in the birders of Wisconsin to recognize most unacceptable birding behavior, and if you are being made uncomfortable by the actions of another birder, don't hesitate to voice your opinion. Use your common sense and be patient. If you are in doubt, give the bird the benefit of that doubt.

Noel J. Cutright
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Dickcissel *by Cary Hunkel* (Wisconsin Department of Natural Resources)

John T. Emlen Jr.: A Naturalist For All Seasons, Part 3: Final Adventures (1960–1989) and Lasting Tributes

by Sumner W. Matteson and R. Tod Highsmith

Seabird Studies in the North Atlantic

When John Emlen returned to the University of Wisconsin-Madison campus in fall 1959 after his extensive African and European travels during the year, his exhausting pace hardly lessened. He resumed a hectic university life, with a growing number of graduate students seeking his services as an advisor. The next few years, 1960–62, were marked by intensive activity, including "service on an NSF [National Science Foundation] review panel, scientific meetings in Europe, lectures all over the U.S. on gorilla behavior, and endless conferences with primatologists organizing field research projects. Summers provided breaks in which I indulged myself in field research on seabirds on Kent Island in the Bay of Fundy and in the huge colonies of guillemots, puffins, and petrels off the coasts of Newfoundland, providing more adventures for my already rich store of experiences."

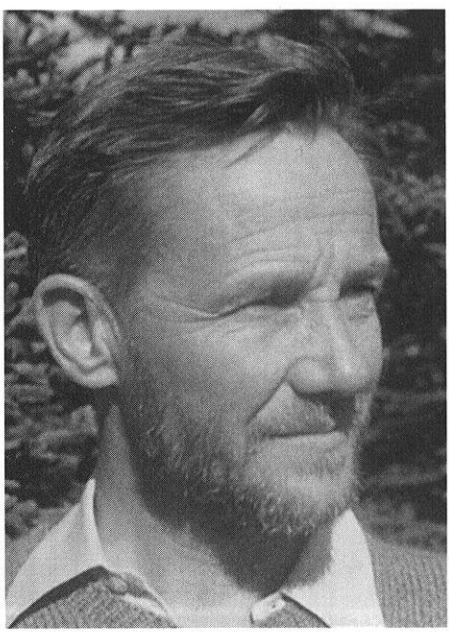

Figure 1. John T. Emlen Jr. in 1960. Emlen Family Archives.

Having discovered the excitement and research opportunities provided by the gull colonies of Lakes Michigan and Huron in the summers of the 1950s, I began to realize that there was a whole other world of birding opportunities out on the North Atlantic. Specifically I thought of islands off the coast of Maine, Nova Scotia, and Newfoundland. At the same

time my interests were broadening into various aspects of bird behavior. I recognized that the vast colonies of seabirds on those coastal islands could provide endless opportunities for experimental work on the development of behavior in the chicks.For my initiation into this new world of marine birds, I chose Kent Island in the Bay of Fundy, famous for its gigantic tides—the largest in the world—and its ornithology research station, run by Charles Huntington of Bowdoin College. Herring Gulls and Leach's [Storm-] Petrels were the dominant avian residents of this islet, so I selected one of these species—the gulls—to be the subject of my first North Atlantic research project in the summer of 1960. Kent Island reportedly had some low rocky cliffs on its eastern shoreline where I might be able to explore aspects of the remarkable individual variations in cliff edge responses that were puzzling psychologists and animal behaviorists around the world . . . .

Many species of animals—from dogs, cats, and mice to baby chicks and ducklings—showed . . . variability in response to cliff edges. The question quite naturally arose as to whether . . . withdrawal from cliff edges was an innate or a learned response. Birds should be good subjects for such studies since Konrad Lorenz, the German psychologist-ethologist, had demonstrated a remarkable ability in them to form strong learning traits very early in life, calling it imprinting.

Here on Kent Island I would take newly hatched Herring Gull chicks from their nests and present them, one at a time, with a cliff edge situation. Some of my subjects would come from nests on flat beaches or grassy plains. Others would come from rocky cliff edges above the tidal slope lines. My inspiration for the latter group came from photographs I had seen of kittiwake gulls nesting on narrow cliff ledges on which the chicks appeared to be holding back, clinging, as it were, to the safety of the deeper ledges and crevices.

My cliff for these experiments was an artificial one—a 7-foot tripod. At the top of this tripod was a horizontal 15- by 15-inch plexiglass platform, covered except for the outer three inches with a strip of semi-opaque gummed paper. Beneath this platform I would stand and watch my experimental chicks as silhouettes against the sky as they wandered about above my head and sampled the edges to decide whether or not to jump. In my position below, I was invisible to them. This enabled me to record and time the movements and the behavior of each silhouette above me in considerable detail. Several hundred chicks from 3 to 12 days of age and from various types of nesting substrates were tested in this way.

Jinny and I had a lot of fun, at least a lot of genuine adventures, performing these tests. Day after day the parents of our chicks incessantly plunged down on us from the sky, spraying our caps and jackets with their excrement and even striking our capped heads with their feet or their rather hefty bodies. We actually took pride and had daily afternoon competitions as to which of us had accumulated the larger deposits of whitewash on those caps.

But in spite of these playful distractions from our serious project, the results of our tests were disappointing, and, looking back, quite unconvincing. The 'cliffs' on which our chicks were placed were apparently not scary enough to produce the clear fear response in the chicks that we had anticipated. Our flat ground tests were therefore not contrasting enough to provide a distinct control for our experiment. The experience of trying was a valuable lesson for me, however, both as a learning experience in statistical procedure and as a natural history adventure. I shall never regret having done it.

Emlen decided to attempt similar research two summers later, blaming his

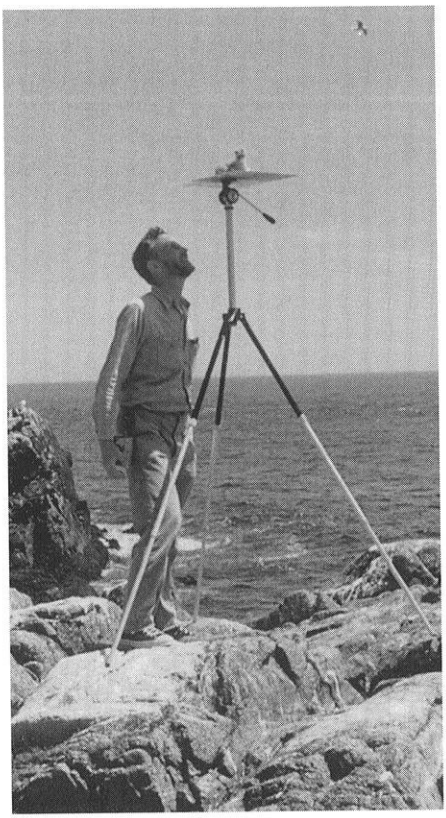

Figure 2. Emlen performing "visual cliff" experiments with Herring Gull chicks at Maine's Bowdoin College Field Station on Kent Island, 1960s. Emlen Family Archives.

failure in 1960 on "inadequate advance information on the nature of Kent's less-than-precipitous eastern shoreline." Perhaps if he had gone to Newfoundland, he thought, he at least would have had the proper conditions to conduct his research.

> Maybe an experiment with a genuine cliff nester such as the murre or the razor-billed auk would be worth a second try. Accordingly, I organized a trip to Newfoundland for the summer of 1962. This trip would take [Jinny and] me to one of the steep rocky islets off Newfoundland's east shore where thousands of these ledge nesters lived on narrow cliff ledges every summer.

For my research base I picked the village of Witless Bay, a few miles south of the capital of St. Johns. There Stu Peters, an ornithology minor from Cornell and then the government forester and wildlife officer for the province, was located. Witless Bay was a rather dismal collection of a few dozen fishermen's houses scattered irregularly over a peninsula of five or ten acres between the coastal road and the sea.

With the help of one of Stu's ornithological friends we located a friendly cod fisherman in Witless Bay by the name of Will White. A bachelor who was hoping to find a wife, Will had just finished building a nice little two-room cottage at the south edge of town. The wife never showed up, so Will was happy to offer his place to us for a modest rental, and we accepted it without hesitation. Will also owned a sturdy, open fishing boat with a 15 h.p. motor. He offered to ferry us out to any one of the three offshore islets swarming with thousands of Razorbills, murres, kittiwakes, and puffins just as soon as the weather permitted. It had been raining and blowing up heavy seas every day for the past several weeks. But the weather would "certainly clear soon," so we accepted the whole arrangement with anticipation and excitement.

Will had no furniture in the house, so he helped us unscrew the back seat of our station wagon and carry it in along with our two air mattresses and sleeping bags. Adding a couple of discarded orange crates found on the town dump and two spare cushions from his own house, we were furnished! We noticed a complete absence of toilet facilities in Will's house, but Will assured us that several of the neighbors had privies that we could use "if and when we needed them." But as we soon observed, the general custom in town was to use an enamel pail and just dump the contents each morning

over the cliff and down into the sea. This was much easier, and there were no restrictions as long as we were "considerate of our neighbors."

Municipal facilities were at a minimum in this obviously unincorporated village in 1961. Telephones—"too expensive"—were nonexistent, and no electricity was available after the town's single compressor shut down at 10 P.M. Just simple living, and the populace seemed happy with the arrangements including, of course, the complete absence of taxes.

Will was a good neighbor but obviously a lonely man, anxious to make conversation with strangers from the outside world. Evening after evening he joined us for a half-hour visit, providing endless tales about his last season's fishing successes, the marvelous delicate taste of codfish tongues, and the annual spring harvest of gull eggs that he and his friends were privileged to gather as Newfoundland residents. All tales were delivered in a slow brogue that we first interpreted as Scottish but eventually decided was probably a Cornish dialect. Will was a loveable man with a refreshingly naive view of the world. He always ended his visit with a weather prediction for the morrow—never optimistic and always, as it happened, correct.

The weather, in fact, was so bad that summer that Stu Peters, as the island's forester, had no forest fires on the whole island to worry about. He therefore had no use for the three helicopters he had purchased for his Forestry Department for fire fighting.

Wishing to break them in, however, he flew down one afternoon and took me out on a spin to some of the bird islands on the south Avalon Peninsula. We passed over St. Mary's Island where there was a beautiful nesting colony of gannets, a species that I had not seen since my boyhood trip in Scotland. On our way back we sighted a small herd of caribou, the first I had ever seen.

But after a few weeks of waiting for the sky to clear, we realized that time was running out. I had not managed to get out to any of the three Witless Bay islands where I was hoping to do my field study. The nearest was Gull Island. Will could ferry us over as soon as he thought we could make a safe landing. But he would do so only if we would take a week's supply of food with us just in case the weather worsened enough to prevent a safe pickup on short notice.

A day acceptable to Will and his firm safety requirements finally came. With our pup tent, food supplies, and basic tools, we made the crossing and landed in a narrow cove at the foot of a steep grassy slope. Shouldering our gear as Will headed back to his fishing, we scrambled up the forty-degree slope. But nowhere could we find an even moderately level place on which to pitch our tent. Half way up the slope, however, the turf seemed a bit more level. So with our shovel we started digging a shallow trench around the tarp that marked off the location for our prospective sleeping bags.

As we sank our shovel into the deep soft turf, we were horrified to find that we were exposing several live petrels and petrel eggs. Before we realized what we were doing, we had dug into five burrows. Five comatose and bleary-eyed petrels and ten chalky white eggs lay out there before our eyes! Hastily we tried to undo the damage we had perpetrated, but that damage could only be partially repaired.

Crawling into our sleeping bags we realized that there were a dozen or more of these birds softly trilling away in their burrows right under the canvas floor of our tent. Some of the birds were obviously just a foot or so from our ears. All night long they continued this wonderful concert, that sound mixed with the endless drops of rain finally lulling us to sleep in a new world, a world that neither of us knew existed on this planet.

The morning broke early in this relatively high, 48-degree north latitude. After a hearty breakfast, we were off to explore our island. Petrel burrows were everywhere. We estimated thousands just on our camping slope, which meant millions of burrows were found on the entire 600-acre island. In the daylight, all of these petrels were completely silent under the ground. We scrambled up to the island's crest, then back into the small central valley of scrubby spruce where most of the petrel population held sway. Descending into a shallow basin we were surprised to find hundreds of dead petrels and a few dozen dead gulls strewn over the ground.

The source of this carnage we soon discovered was a single red fox. Although more than a mile from the mainland this single animal must have crossed on the ice the previous winter to make its home here. The island was a 'fox heaven' with far more than he could possibly eat just for the taking in a few minutes of desultory digging and chomping.

No wonder petrels establish their nesting colonies only on islands too small for predators like the red fox, which behaviorally seem to require large foraging ranges. No wonder petrels often crowd up in vast densities on small, predator-free islets and avoid comparable breeding niches on mainland areas and on larger islands where foxes and other wide-ranging predators have become established.

We reported the huge destruction of birds to Stu Peters in his office in St. Johns, suggesting that he might want to dispatch a hunter or trapper to the island to terminate the destruction of wildlife we had seen there.

Hoping for more petrel observations we stayed on, but the rain continued unabated. After trudging around that islet in heavy rain gear and boots for six days, we gave up and signalled Will in his evening rounds that we were ready to return to civilization. That next morning, as we should have guessed, the sun rose bright and clear. Will appeared as arranged, but instead of returning to the dreary Witless scene, we enticed him to ferry us across to Great Island a mile to the south with its nesting colonies of gulls, puffins, and other sea birds.

These birds could obviously provide us with more adventures, but a new challenge faced us. Clouds had reappeared, and wind was whipping up the bay. Clearly our greatest adventure here would be the unloading and reloading of ourselves on the steep, slippery coastal rocks of Great Island. Will was hesitant as we approached, but we cruised in for a landing anyway.

The waves were heaving us up and down over several vertical feet as we approached a rocky promontory that seemed to offer the best possible landing site. When a giant wave raised us to its high point, I leapt and made a landing. Clinging to the slippery surface of a huge rock with my fingernails, I scrambled up to the rock's crest.

And then it was Jinny's turn. She hesitated but Will and his trusty assistant, Bill, grabbed her and, with a tremendous heave, launched her at the critical moment into the air to land sprawling on that slippery, wet, steeply sloping surface. From above I grabbed her jacket collar, and there we were—safely landed on that uninhabited islet off the stormy Newfoundland coast.

Pausing to catch our breaths after the landing ordeal, we scrambled to the crest of the island and flopped down exhausted on the soft turf near the summit. The clouds had largely dispersed and, with the sun out and providing a bit of warmth, we sat back and gazed out over the beauty of Newfoundland's Atlantic coastal sea. Hundreds of gulls, murres, and cliff-nesting sea birds were milling about over the windswept whitecaps down below, while long lines of cormorants cruised back and forth between nearby islets.

From our lookout a gentle grassy slope led down a few hundred feet to a vertical precipice that plunged vertically downward to the sea and the pounding surf below. Lined up along the rim of this cliff were groups of puffins, those plump little clowns of the sea unabashedly sporting their gaudily colored beaks and splashy eye make-up. Seemingly keeping one eye suspiciously on us, these comical fellows would pop up from their nesting burrows down there on the cliff rim, look up at us, and then drop down over the rim to buzz off, bee-like, into the wind-tossed sea, landing, kerplunk, on its heaving surface. Their nests—tunnelled into the soft, spongy soil of those lower slopes—were craftily shielded from us except as our feet, invading their privacy, might crash through the crumbling surface soil to expose their secrets to us.

We spent that whole afternoon just enjoying the scene, observing and photographing puffins at their burrows, but keeping in mind that we had a firm date with Will to pick us up on that scary landing rock before dark. Despite the sunshine, the wind and the waves remained tempestuous all day, and our arranged departure from that slippery promontory would obviously be difficult and hazardous.

After a full day of deep sea fishing, Will's boat deck would obviously be even more slippery than at the morning landing. Washing it down with pails of sea water would not appreciably remedy this situation. But our rescuers were ready for us when we arrived. Will, with his cleated boots firmly planted on the slimy deck, would be the body-catcher. Bill would deftly maneuver the outboard to prevent the heaving craft, as it rose and fell with each successive wave, from crashing onto the rock.

Then, as the boat rose on an unusually high crest, Will gave the signal, "Jump!" Jinny flung herself into Will's arms as he maneuvered to keep his balance. The succeeding wave was again a topper, so I leaped. A bit heavier than Jinny, I toppled my friend Will, and we both crashed to the slippery deck in disarray. No injuries sustained, we rose to wipe the fish scales, slime, and general crud from our hands, faces, and clothes. Within minutes we were chugging back towards Will's home in Witless Bay. No hot tub or steaming supper of juicy tenderloin steak would greet us, of course. But a good solid supper of cold canned tuna and two firm cots were all that we needed.

As they turned out, these two summers in the North Atlantic were rather unproductive as far as research was concerned. They were, on the other hand, rich in adventure . . . .

Penguin Research in Antarctica

A new adventure and research opportunity followed in the fall of 1962. The previous year, another of Emlen's graduate students, Richard Penney, had received "an NSF grant to study the breeding behavior of Adelie Penguins at Australia's Wilkes Station in Antarctica and had just returned from that remote outpost with exciting ideas . . . ."

Reflecting my developing interests in animal navigation, Rich suggested that he and I organize a project on penguin navigation. The birds could be followed visually as they set out on foot across the vast expanses of ice and snow that are the Antarctic continent. Furthermore, he knew that they could find their way home over long distances of essentially featureless terrain, for in 1959 he had dispatched five Adelies by plane from the Wilkes rookery to the American base at McMurdo, 1,200 airline miles to the west. He had since learned from his Australian buddies that three of these five birds were back home, having made that perilous journey in time for the 1960 breeding season.

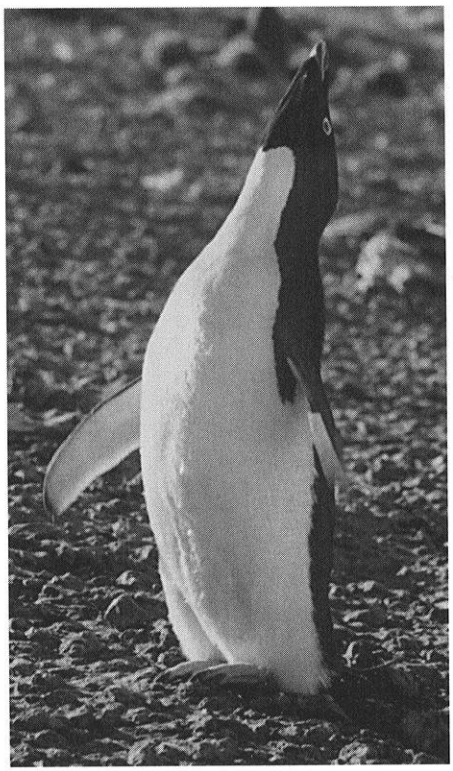

Figure 3. Adelie Penguin performing "ecstatic display" at Cape Crozier, Antarctica, 1963. Photo by J. T. Emlen Jr.

Obviously, walking that distance across the high intervening mountain ranges without access to food or water would have been physically impossible. These birds must have first walked 500 miles north from McMurdo to the coast at Cape Hallett, then followed the Ross Sea coastline eastward some 2,000 miles on floating sea ice, and finally identified the proper longitude and moved inland to their home rookery. Instead of just 1,200 miles these birds had traversed at least 2,600 miles mostly on sea ice and had done it in 300 days, about nine miles per day!

Gustav Kramer in Germany had recently described how various species of land birds could recognize compass directions and locate their position on the earth's surface simply by observing and following the sun's position and movement across the sky. Comparing this information with personal memories of the sun's position and movement across the sky at its birthplace, an adult penguin out there on the Antarctic ice could, at least theoretically, have access to all the basic information it would need to navigate from wherever it might find itself on the surface of the earth to its place of origin, its natal home.

Assuming some homing ability, we visualized that Adelie Penguins in Antarctica might be ideal subjects to track as they walked off rather than flew off into the unknown. Adelies offered other assets as experimental subjects. They would be highly visible (their large, black backs contrasting with their white homeland), they were abundant and easily captured, they left tracks in the snow that could be readily followed, and they would be unfamiliar with inland landmarks.

Fired up by the prospects of this exciting new project, we applied for a grant from NSF's Antarctic Program and in late September received word that our grant had been awarded. Within a few weeks and after a required health checkup at the Great Lakes Naval Base near Milwaukee, we were off to California and thence to Christchurch, New Zealand, the takeoff point for all American flights to the Antarctic. Here, at the U.S. departure depot, just as all our plans seemed to be advancing with wonderful speed, I heard my name called on the P.A. system. "Emlen, E-M-L-E-N, report to headquarters in Room 256." I obediently climbed the steps to that office where I was told very directly and simply that I would not be allowed to proceed! Amazed at this curt and simple announcement, I protested. "Why sir?," I asked. "How could this be? After all our preparations and the unanimous approval of our project, after an award

of financial support for the project, etc., etc . . . ."

All of these protests seemed to fall on deaf ears for, with a nod, I was dismissed. I returned to the line-up of Antarcticians downstairs, determined to board the plane to the Antarctic unless physically restrained. A half-hour later we all boarded without incident. On reflection I guessed why that officer had tried to stop us. I was one of just two prospective Antarctic voyagers that year over fifty years of age, and this officer was simply concerned I might not be fit enough for the expedition. I had, however, passed the basic tests. In any event we were now on our way, and the authorities could obviously not call me back. That was all that really mattered.

The bowels of the plane were cold, a foretaste of what was to come in the land we were approaching. We rolled up in our cold weather gear along the walls of that giant four-motored C-130 (which had no seats), as it roared down the runway and off into the night. It was the last night of darkness that we would experience for three months, for, of course, the sun never sets in the Antarctic between September and April—the southern hemisphere's summer season for which we had planned our research.

McMurdo was a strange land where the human personnel, all male back then in 1962, kept schedules that fit their particular work routines. In the large mess hall ham and eggs were served around the clock, or, if one preferred, steaks and vegetables. You just named the meal you wanted, and you got it. In the bunkhouse dormitories roughly a third of the residents were asleep at any given moment in keeping with their assigned activity schedules.

Outdoors, McMurdo was a miscellany of frame buildings, Quonset huts, and barracks half-buried in a dump of discarded oil drums, broken-down tractors, and garishly painted packing crates. A small nuclear power plant—nicknamed Nukki-Poo—seemingly lent some dignity to the barren scene. Supposedly this feature supplied the power for the base if and when it was functional. A few trim officers' quarters and an extensive barracks for enlisted men—soldiers, sailors, and air force personnel—completed the incongruous array.A few miles inland lay New Zealand's Antarctic base, small and neatly maintained in contrast with the unsightly sprawl of the American junkyard. Dog sledges and several dozen sturdy Eskimo huskies were tethered out on the ice, the 'Kiwi's' basic means of transport for their local research ventures and obviously a source of great pride to their small staff of scientists.

The scientific staff at the American base was made up of an impressive group of geographers, geologists, glaciologists, and biologists of which Rich and I were proud to be members. The ice-paved air strip on the broad plateau to the south provided the only landing field on the entire Antarctic continent capable of handling large transport planes. It was a true monument to both polar engineering and American ingenuity.

Taking a vehicle assigned to the USARP (U.S. Antarctic Research Program), we drove out to Cape Royds, the farthest south of all Adelie Penguin rookeries and the site of Robert F. Scott's base camp in 1911. The camp consisted of one hut, which was in beautiful condition, the nearly solid accumulation of snow inside the hut having recently been removed by a group from the New Zealand Historical Society. The tables, chairs, and lamps had been recently cleaned, and the bunks were equipped with reindeer-skin sleeping bags like those used by the Scott expedition. Canned fruits and bottles were aligned on shelves, and even a selection of the magazines and newspapers of the day had been laid out on a table just as the members of the Scott expedition had presumably left them 50 years before. Windows were snowed over so that it was

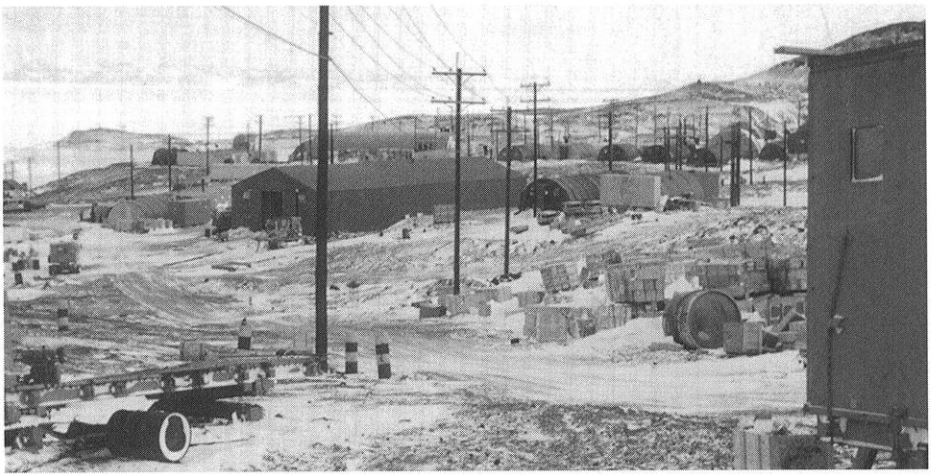

Figure 4. McMurdo Station, Antarctica, 1963. Photo by J. T. Emlen Jr.

dark, but we snooped around with candles. In a narrow passage along one side were boxes of penguin eggs and a partially butchered seal, all solidly frozen of course. Several beautiful sledges were hanging from the rafters, and a pair of old style skis was leaning against the wall near the door.

From Royds we drove out onto the sea ice and down another 10 or 15 miles to Cape Evans, Scott's alternate base and the one from which he departed on his final, ill-fated run for the Pole in October 1911. The Cape Evans hut was in as good shape as the one at Royds, so that with only a little shoveling of the newly drifted snow we managed to gain entrance. Here we found essentially the same basic array of equipment. There was also an excellent, well-stocked, if not modern, darkroom and, in front, half buried in the frozen snow, an old ship's anchor of unknown and unspecified date. What an easy source of loot for some undisciplined GI, we thought, but maybe the distance from McMurdo (some 20 miles) and the miserable weather would provide effective constraints.

The local headquarters for the USARP was centrally located and well equipped. Here Curly Wohlshlag, a limnologist from Stanford, held forth and ran the show, handing out technical and chemical supplies for the field parties. Also dispensed was his special stock of homemade gin concocted from 70 percent lab alcohol and a mash derived from berries he had personally gathered from juniper trees around his home in Palo Alto.

One day we were called in to the Officers' Quarters to hear the Admiral read instructions for all field parties including ours, the only two-man team on the ice that year. We were told each party had to have a competent medical officer and a designated radio officer. Rich would obviously best qualify for the latter position; I, by a process of elimination, was selected as the most competent medic. No problem. My sister Mary back in Germantown, on reading of my new promotion, found a pocket-sized manual entitled *How to Remove One's Own Appendix* and dispatched it to me. I truly appreciated her concern. Fortunately I never had to use it on myself or on Rich.

But time was a'wasting! We had to get on with our navigation experiments just as soon as the Adelies returned from their winter foraging on the high seas.

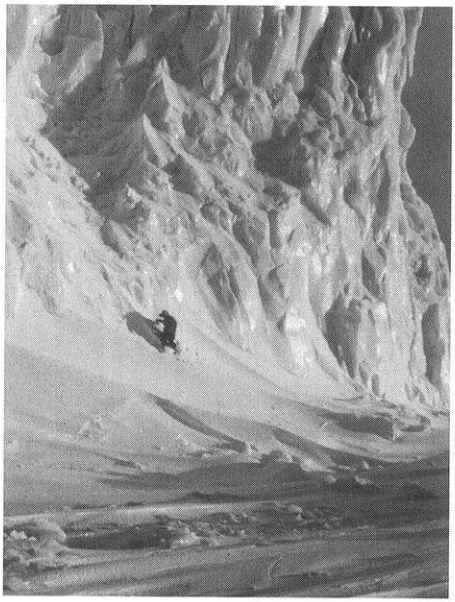

Figure 5. Richard Penney traversing base of ice face near McMurdo Station. Photo by David H. Thompson.

The males would come in first—two weeks before the females. Therefore we planned our experiments entirely around them. Since they would arrive over-nourished, they would require no artificial feeding for at least two or three weeks, a wonderful break for our initial experimental releases. The females would come in later to lay their two eggs and raise the chicks on the nest sites established and defended by the males.

According to Bob Wood, a representative from [ornithologist] Bill Sladen's team at Johns Hopkins University, the first males would be in shortly after November 1. We had to be prepared for that arrival with detailed plans for capturing and transporting representatives to our selected release site far inland on the ice shelf. That meant becoming familiar with the site where our penguins would be captured—Cape Crozier, which would soon be swarming with some 300,000 nesting Adelie Penguins. Besides planning details for our experimental releases, we also wanted to see the basic facilities that Bill Sladen had established for his extensive penguin banding activities.

Also there were outstanding opportunities for exploration and adventure on the Cape if and when we found time for them—three species of Antarctic seals; skuas lying in wait for the arrival of the Adelies; Giant Petrels; and a colony of Emperor Penguins, those giants of the ice that chose the coldest months of the year, now already passed, to lay their eggs and hatch their chicks.The leopard seal, a large carnivorous creature famous for its method of skinning Adelie Penguins by grabbing them in its teeth and flipping the skin off with a toss of the head, was quite abundant offshore, where apparently it lay in wait for the birds' arrival. One day, October 16 to be exact, as we approached the strip of thin ice along the tidal shear, one of these great animals lunged up through the 2-inch skim with a swoosh and a roar, apparently responding to our shadows and, perhaps, hoping for a meal that we had no intention of providing. Fortunately this fellow slipped back into its ice hole leaving us alone . . . .

On a stretch of sea ice at the west end of Cape Crozier was a nesting colony of about 1,100 Emperor Penguins. Standing solemn and erect in their snow-white vests, they were sheltering a smaller number, perhaps 500, of duck-sized chicks. We assumed that these adults were largely, perhaps entirely, females, since we had noted in our reading that the males, having completed their 60-day assignment of incubating the single egg in temperatures that could drop to −70°F, had taken off for a two-month vacation of feeding on the high seas.

Now in late October the adult females were in full charge of the scene, each mother bird brooding and feeding a chick that her mate had hatched from an egg laid and turned over to him some-

time back in July or August. Dashing out periodically to the now reasonably close sea, she would leave her chick in one of the colony's nurseries for safekeeping, to return periodically to feed it from a regurgitated bellyful of nutritious half-digested krill.

The growing chick, now 15 or 18 inches tall, generally stood erect in front of his mother, pressing its back against her towering white belly, peering out at the crowded scene of parents and chicks. If the chick [was] chilly it would just turn around and duck into the capacious downy brood pouch on its mother's belly. This brood pouch was raised above the cold ice surface on her broadly webbed toes.

If pressed to break into a slow shuffling walk by our approach, the brooding mother might occasionally spill a chick out onto the ice. Occasionally an overripe or frozen egg might also appear, rolled out onto the frozen surface by a clumsy or careless adult. But, as assiduously as if it were a dislodged chick, such eggs were quickly retrieved by one of the chickless adults within view and tucked away in her brood pouch for safekeeping. So eager were these barren mothers to rescue any unclaimed egg that even an egg-sized chunk of ice would occasionally be rescued and tucked away—if only briefly—into a brood pouch. Where no chicks, eggs, or ice cubes were available, barren females typically simply rolled back on their heels and tucked their slightly elevated toes up into the thick, warm down of their empty brood pouches.

One day we decided to wing-band some of the Emperors. Weighing only half as much as either Rich or me, we expected little trouble but, as we sized up our opponents, we realized that every bird could mean a real wrestling match. Equipped with short, bony flippers and strong, heavily-clawed toes, each bird could be a serious challenge.

And they were! I crept up slowly on the bird I had selected to subdue and, carefully planning my approach, attempted to throw the hefty creature—using a full nelson up under the flippers from behind and then over the neck with both my arms. The bird brought her legs into play and quickly disarmed me. Then it became a free-for-all with both Rich and me getting the worst of the fracas. After five minutes of heavy combat we decided that the best solution would be to match two against one—two humans against one Emperor, that is. Though hardly cricket we now could divide the problems of subduing our opponents. Applying this strategy, we managed to bring several of our adversaries under control and slip a band on the left wing of each bird. Triumphantly we left the scene of controversy, a bit battered and bruised, but the undisputed winners.

While Emperor Penguins and seals were utterly fascinating, the real objective for which we had come to Antarctica was, of course, to release a series of Adelie Penguins on one of the vast, featureless, ice fields of the continent's interior. Releasing them, one at a time, we would simply let each bird head off in whatever compass direction it preferred. The choice was among the full 360 degrees, and we, as humans, could see no basis for a preference. Looking at our maps we knew the precise compass direction of the home rookery, and perhaps that would be the preferred direction. We tended to hope it might be, but that decision would be up to each bird, and there were absolutely no cues available to us as mere humans to select from.

For this, our first experimental release, we selected a site near the center of the Ross Ice Shelf, a vast, 150,000-square-mile bay of frozen sea ice extending from the Ross Sea half way to the South Pole. For no particular reason we picked the point where the 180th meridian of west longitude, the line separating the western and eastern hemispheres, in-

tersected the 80th line of south latitude, the Antarctic Circle. This point lay near the center of the shelf only about 180 miles southeast of Cape Crozier, from which our experimental birds would be taken.

At Cape Crozier the first 50 or so Adelies of the season made their appearance on November 1, promptly running up from the sea to the areas where they had bred the previous year. The rigid, ecstatic display—upright with slowly flapping wings and a prolonged rattling growl—indicated that all were males, the sex we had decided to use exclusively in these experiments.

Without delay we sent a radio signal back to McMurdo where a small, two-engined 'otter' plane had been readied in preparation for the call, and within a couple of hours the plane was on the ground at Crozier. Using dip nets we selected and captured twenty husky male Adelies, put numbered bands on their wings, and slid their protesting bodies into the twenty ventilated wooden boxes we had prepared for them. With our 8- by 8-foot, double-walled pyramid tent, a collection of tools and other gear, and a three-week supply of provisions already on board, we were ready to take off with our pilot and navigator for the Ross Ice Shelf.

The desolation was just what we had anticipated—endless stretches of flat, featureless ice and snow. After a couple of hours of slow, monotonous progress, our plane, quite unexpectedly for us, dropped altitude and skidded to a landing on its broad snow skis. Taking bearings with our instruments, we discovered that we were some 15 miles from our designated 80- by 180-degree target. We protested, but our navigator, an experienced polar aviator, assured us that we could scarcely expect to do better with no terrestrial targets in place on the surface. Haunted by vague worries about not being visible for the pickup mission, we accepted his pronouncement as inevitable and proceeded to unload.

With efficient help from our pilot and his navigator it took us only a few minutes to dump all our gear out onto the stark, frozen landscape. Without braking the twirling engines of the otter, the pilot and navigator were back aboard, and with a supplementary boost provided by a jet auxiliary engine clamped to the belly of the plane, they soared off into the northern sky—back to McMurdo and civilization. Standing there in a bewildered state we gazed after that little mosquito-like speck until it disappeared over the horizon. Now we were alone, really alone! Alone on a wide, wide sea of ice. I was overwhelmed by a strange feeling of genuine isolation from the world and everything I knew in it.

But there was work to do, lots of work! That monstrous pyramid tent must be raised, and a small, auxiliary tent buried at least 50 feet away, for fire is the greatest hazard for parties camping on the Antarctic ice. Then there was the transit equipment to set up and align, the food must be buried somewhere nearby, and the penguins in their boxes must be transferred to twenty pits, which were dug in the hard-packed snow and covered with individual muslin sheets for safekeeping. It was an awesome assignment, but it had to be done before we could consider a break.

By midnight, we were more than ready to call it quits. Although the sun was shining brightly in the northern sky, our penguins had settled down and were relatively quiet under their muslin blankets, our transit scopes were up on their poles, aligned and ready to go, and all else appeared to be prepared for this, our first day of experimental releases. Grabbing and downing a big bowl of chili, we collapsed into our double sleeping bags on double foam mattresses on the insulated floor of our double-walled tent. Blowing out the little alcohol lamp that amazingly

warmed the entire tent, we quickly toppled off into deep slumber.

But those penguins out there in the pits were growing restless. After only an hour of blissful sleep we suddenly awoke to realize that penguin sounds were coming from directions other than the pit area. Our worst possible dream was realized. Some of those penguins, so laboriously captured and transported to the ice shelf, had broken free and were out there telling us to get moving or we would be in deep trouble.

Frantically we leapt from our bags, pulled on our pants, parkas, and boots, not even bothering to tie or lace them up; perhaps we could do that out on the ice on the run. The birds, at least six of them, were loose, dashing off at their fastest running speeds of 6 to 8 m.p.h., a hot pace for a couple of bone-weary and heavily clad humans. But after throwing ourselves passionately into the chase we tackled and recaptured, apparently in a mere 15 minutes, every one of the escapees and carried them back to their pits. Now, however, we used larger covers and heavier ice blocks to make sure all prisoners were safely locked in. All survived that desperate chase including, amazingly, the two human pursuers. As prison guards we learned an important lesson that first day on the ice shelf: you can't be too careful when it comes to prison breaks by Adelie Penguins.

Our plan for tracking the penguins was one that land-surveyors might use in a similar situation. It consisted of three transit telescopes mounted on 10-foot poles in the form of an equilateral triangle, 200 meters on a side, with one side at right angles to the presumed direction of the penguin's departure, the direction of its home base at Cape Crozier. With each of us standing on the top step of a 6-foot ladder at the two leading scopes, we then called out to each other the azimuth reading of the departing bird at five-minute intervals as our birds, one at a time, picked their course. Later, using triangulation, we converted these readings to dots representing each bird's position. The pattern of dots would thus accurately trace the route selected by each bird as it walked, ran, or tobogganed off from the release point at the center of the triangle of transits. If the successive dots formed a straight line, the bird was oriented; if they formed an irregular pattern or a crooked line, the bird was confused or disoriented.

Except for the accidental escapes that first day, the birds were taken from their

Figure 6. Emlen using sextant to determine homing orientation readings of released Adelie Penguins on the Ross Ice Shelf, Antarctica, 1963. Photo by Richard L. Penney.

individual holding pits one at a time just before their release. They were then placed in a two-foot plexiglass cylinder sunken into the frozen snow. When we were all set the cover of that cylinder was jerked off with a cord, and the bird popped out. What ensued was documented closely. Each bird, obviously bewildered at first, looked back and forth at the symmetrically arranged instruments and the starkly featureless, all-white snowscape beyond. Then, with occasional hesitations and a few false starts, each bird headed in the same direction.

Citing compass directions in the Antarctic can be confusing, because when one is standing on the South Pole, any direction one faces is north. In polar areas, a different type of orientation is useful—rectangular grids. With this system, a line drawn from the South Pole to another given point arbitrarily becomes north-south. There is nothing magic about what point is selected 'as north,' so for our purposes we chose Cape Crozier. After setting the north-south line through Cape Crozier, we developed our rectangular grid around it. We then were able to determine the direction of our initial releases from the Ross Ice Shelf—north-northeast .... This was not pointed toward Cape Crozier but rather about 57 degrees to the east of it.

The speed with which our penguins made this decision was impressive, generally within five minutes, and often within a few seconds. It was as though each bird, on finding itself free, was answering a call from that direction. And they kept on running or tobogganing in that same direction until they had vanished over the horizon two or three miles away.

The dot patterns produced by all twenty birds were consistently and precisely lined up on this unpredicted course. A few of the birds seemed temporarily confused when first released, but there was no question that all of them, released independently at roughly one-hour intervals, knew just where they wanted to go.

We were able to track our birds through the transit scopes for only one to three miles, but the straightness of their courses over this distance, and the subsequent path chosen by the few birds we were able to follow for about 50 miles with radio transmitters, left little doubt in our minds that this was the direction they would follow until they encountered a major barrier of some sort. In this case, that barrier would be the Ross Sea 105 miles straight ahead at a point where the birds would find themselves about 150 miles east of their home at Cape Crozier. A majority of them did make it back home to Cape Crozier within four weeks, as a mid–December check of wing bands in the rookery revealed. But by then thousands of birds were on hand, and there was great confusion in the crowded rookery, so we were unable to make a complete check.

We made dozens of further releases from that 80- by 180-degree latitude/longitude point on the ice shelf. With just a few minor exceptions, all departures were in the same direction—a north-northeast startoff towards the sea.

Apparently with these first releases we already had an answer to our first and basic question for the Adelie Penguins. They knew the direction they wanted to follow whether or not that direction would lead them directly towards their home. For this they must have had some sort of cue available to them, as they proceeded along this compass course. We suspected that it was the sun, the same sun that, although constantly moving, had provided a reliable, fixed direction for Gustav Kramer's songbirds in Germany, as it rose in the morning in the east and set in the evenings in the west. Here in the Antarctic the sun's path was very different, however, never either rising or setting but coasting along in a wide circular path around the horizon every 24 hours with essentially no terres-

trial landmarks to indicate its compass direction or its speed of progress. Could our penguins be keeping track of the time of day with that circular movement, or did they have some other way of identifying at least the primary compass directions?

The identity of the sun as the prime directional cue for our penguins would be quite simple to ascertain, and just a few minutes in the Antarctic sunshine would apparently provide the complete and convincing answer. The birds were not only able to use the sun as a directional cue but also were apparently dependent on it both for their orientation and for their freedom to move about on unfamiliar terrain. Every time a cloud drifted across the sun's surface, the penguins would simply drop all compass-oriented responses within a few minutes. Even when the sun's disc was only partly obscured by clouds or haze, the birds seemed to lose their ability to orient. We were, and I still am, puzzled by their apparent dependency on a clear image of the sun's disc. There in the Antarctic we often speculated that the almost frantic pace at which our penguins dashed and tobogganed off towards their projected destination might be related to a fear of being caught in a small cloud shadow. But with the sun circling inexorably around the horizon every 24 hours, why should our birds, every one of them, regardless of the hour of release, select that same north-northeast compass direction? Looking at our maps we found a possible answer. Cape Crozier faces the offshore sea in a similar direction—northeast. That was the direction from which the young penguins saw their parents come in with bellies full of krill and, perhaps even more important, that was the safest and surest escape direction if they should wander off into unfamiliar territory behind the rookery. With such survival significance we speculated that this outward compass direction could become imprinted on all Cape Crozier chicks in early infancy and hence become a population characteristic. If this made sense, chicks from other rookeries around the roughly circular Antarctic continent might show similar outward, offshore orientation patterns guiding them to at least temporary safety and to their only reliable food supply.

We could test this hypothesis experimentally in two ways. First we could transport Cape Crozier birds to other release points to the east and west of our original 80- by 180-degree position and could note the compass direction that they chose. Secondly, we could pick up birds at various breeding rookeries around the Antarctic coast and could release them at the same position and watch their orientation response. Theoretically at least, all of these birds would select courses parallel with the outward, offshore direction of their home rookery wherever it happened to lie. These experiments would take time, more time than we would have in this current 1961–62 'summer,' but we could certainly start on the first series and be formulating plans for the second for another year. Anxious to get going, we radioed McMurdo and arranged for passage for 20 penguins and two 'penguinologists' for the next flight to Byrd Station, about 1,000 miles to the east in Marie Byrd Land at 120 degrees west longitude and 80 degrees south latitude. Byrd Station was a large subnival structure, tunneled into the ice for research on meteorology and deep ice structure. Meals and bunk facilities were available, but particularly attracting us was a Nodwell snow vehicle outfitted as a house trailer if we wanted it. Rich was familiar with these vehicles, and we quickly accepted the offer, driving it out to a likely camping spot a few miles south from the litter accumulation around the Byrd airstrip, offering horizon-distance views in all directions.

It was cold (-10°F) and with strong surface winds blowing up clouds of stinging snow crystals, we holed up for a good

home-cooked meal and a much-needed sleep. On arising we set up our transit scopes, one on the roof of the Nodwell, the other 200 meters to the east aligning a north-northeast departure direction, our best guess on the direction our releases would select. For several hours we waited for the sun to show up; it never did! In desperation we released one bird and got what we expected—a clearly confused and befuddled penguin. After a half-hour wait it started off to the southwest, walked about 100 yards, and disappeared in the blowing snow. At that moment the overcast lifted briefly, and our bird, momentarily visible, started to move toward us. Was it an oriented move? We could not be sure, but it was suggestive, and we recorded it. A few hours later the sky cleared partially, and our bird started tobogganing towards us—in the same northeast direction—but again the sun faded, and the bird stopped.

Intermittently overcast or stormy weather persisted for the entire six days that we had scheduled to be at Byrd Station. Occasionally we caught a glimpse of the sun, but it was gone almost before we were able to take advantage of it. All in all, we considered that only six or eight of our 20 releases could provide usable information on the direction selected. All of these birds chose an essentially northeastward compass direction, which was apparently a bit to the east of the direction chosen by our ice shelf releases . . . .

Incidentally, it was here at Byrd Station with all its problems of human visibility and penguin disorientation that I experienced my first and only encounter with a genuine polar whiteout. Walking along a row of darkened bamboo poles driven into the hard-packed snow as a guide for just such emergencies, I suddenly realized that I had lost all ability to orient myself. The horizon had simply disappeared and with it all cues that I normally, but unconsciously, depended on for just moving around.

Those bamboo poles had simply vanished, swallowed up in the dense white fog cloud that had settled around me. The huge, black snow boots down there on my feet had become my only visible reference to the real world as I found myself strangely afraid to step forward for fear of stepping into some invisible abyss. I knew very well that it was no more than 30 steps to the next pole in that grid, but where was it? My eyes moved to the right, to the left, then up and down, searching for that invisible pole, but nothing was out there where I knew very well it must be. Finally, after maybe 10 minutes of searching in unbelievable frustration, a pole took form. But this pole amazingly, was not on the surface but about 10 feet, or maybe even 15 feet up in the air, just floating, with no indication of the surface on which it was planted nor, of course, its position in the grid. I dared not walk toward it for it would undoubtedly again disappear to leave me with nothing for reference but those strange black boots on my feet. I just had to wait for this whiteout to dissipate or somehow disappear and had to hope that it would not take too long to do so. Sometimes they said it took hours, even days! Fortunately, I was not stranded for long. Not surprisingly, whiteouts are one of the major hazards for humans in the Antarctic.

Although we considered our results in Marie Byrd Land disappointingly vague, our schedule demanded that we must move on. On the radio we managed to line up our trusty otter and its friendly pilot and navigator for a penguin-launching expedition to the 7,000-foot Victoria Land Plateau several hundred miles to the northwest of Cape Crozier at latitude 75 degrees south and longitude 155 degrees east. Here we would camp out in our same double-walled pyramid tent and, with luck, release 20 more Cape Crozier penguins.

It was a beautiful sunny day when we awoke and, with transits aimed to the north, we again started our releases with the sun, as always, swinging clockwise around the horizon. Again our Cape Crozier birds seemed to know just where they wanted to go—to the northeast, about 20 degrees east of the direction selected at the Ross Ice Shelf.

Our releases thus far were beginning to form a pattern. The penguins all headed north and east. But how could these more or less parallel directions help a penguin find its home or, for that matter, any refuge for survival in a vast circular Antarctic sea? Since Adelie Penguins returned annually to their natal rookeries, did they possess an independent homing sense that they could finally call upon, aside from anything we had seen in their selection of departure routes from any of our three release sites? Obviously we still did not have the full answer to our central question. But somewhere in the back of our minds an answer was forming. This answer proposed that the birds from each release point, in fact from each rookery on the Antarctic coast, had their own orientation system! We would have to test this proposition with birds from at least two rookeries, one at a substantial latitudinal distance from Cape Crozier, and this would call for major new planning. Now, already mid–December, we would not have time to perform that critical experiment this season and would have to consider a whole second season in the Antarctic. Our gut reactions were not wholly enthusiastic for such an idea, but an answer to the dilemma that faced us said we must! We must return to our homes in the U.S. and apply for a second grant that would take us back to this miserable cold place at the bottom of the world. Would we have any prospect of landing another grant? We returned to the U.S. in January, I to Madison and Rich to his new home in New York, enthused that we knew how to proceed and determined to somehow get the necessary funding.

Figure 7. Emlen recording field notes of Adelie Penguin behavior. Photo by Richard L. Penney.

But there were several weeks still before we were scheduled to leave Antarctica, and we wondered how we could most profitably spend them. I was curious to see how the U.S. supplied its various Antarctic bases. So I signed up to join the icebreaker, the USS *Glacier,* on its annual run from Christchurch, breaking a channel through the ice-bound Antarctic Sea to McMurdo.

After catching a service plane to Christchurch, I walked to the U.S. Navy dock where the 9,000-ton *Glacier* on which I was booked was being prepared for its annual mission. That mission was to cut a channel for the ships that would be supplying the American bases during the 1962–63 Antarctic summer. The first ship of the season, the USS *Merrill,* would follow us at a safe distance of about a half mile. The *Glacier,* with a cruising speed of 15 knots, should make the trip in nine or ten days if not delayed by bad weather, which was unpredictable and frequently severe at this season, or by an unusually heavy ice pack.

With a crew of a dozen officers and 20 or 30 enlisted men, we 'set sail' on December 21 at six in the evening with two helicopters lashed securely to the stern deck, three gun emplacements (properly capped for this peaceful mission), and a large radar antenna spinning conspicuously at the masthead. I was assigned an upper bunk in a double stateroom and was shown the mess hall and the ward room, a lounge for officers and senior personnel with whom I was categorized. These quarters had comfortable chairs, tables, and magazines, plus a phonograph playing rather doleful Christmas carols.

Seabirds were abundant the first day out, mostly petrels and shearwaters, but they included several species of albatross, those long-winged giants of the south seas with wingspreads up to 11 feet, gliding back and forth across our wake. It was terribly windy, and as the second day ended, we realized that a real storm was brewing. By supper time the ship was rolling heavily so that it was difficult to navigate the ship's decks or corridors.

Returning to my bunk I found that it would be hard to stay in bed without being rolled or tossed out onto the floor. I curled up on my side, my knees braced firmly against the outer bed frame, my back pressed against the inside wall. With my hands I was grasping a strut, while my head was nestled in the crotch of my elbow to keep it from rolling back and forth with every roll of the ship. First, I was rolled backwards to find some security against that back wall, then forward to look steeply down at the floor. Slowly, mercilessly, I was tossed back and forth, hour after hour. The back and forth rate was about ten seconds, and I estimated each pitch was about 45 degrees—enough to put the fear of God in me on each forward roll. I learned later that I had been conservative in my estimate; officially, according to the ship's log. The rolls were up to 51 degrees despite the stability provided by special water stabilizers in the ship's hull! No worry, the ship had experienced rolls up to 67 degrees, and its stability was guaranteed up to that level. No one was allowed out of his bunk, however, and the few sailors on special assignment had to crawl along on hands and knees to avoid serious injuries.

Amazingly, my good luck prevailed, and I wasn't seasick throughout the whole storm from half past six in the evening until half past five the next morning. I was not the slightest bit interested in food, however, until eight that morning when a light breakfast was offered in the mess hall. Many of the experienced seamen were not as lucky as I and confessed to miserable spells of seasickness. A few had been tossed out of bed, and one fellow had his teeth knocked in, but the ship's doctor reported no serious injuries.

Heavy seas continued to roll and pound us relentlessly on the third and

fourth day out of Christchurch, but on Christmas Day the weather improved, and we were all invited down for a big feed—with jackets and ties, of course.

But new and more interesting things were happening up on the deck. Icebergs were appearing, most of them small (the size of a house), but a few were massive mountains of glistening green crystal more than a half mile in diameter as they floated by on the sea. One had a great arching melt tunnel on its flank. Bathythermographs were being lowered from the deck to provide temperature gradients down to the sea bottom thousands of feet below, and air temperatures hovered close to freezing. Whales of several species were surfacing, arching upwards and spouting nearby or out towards the horizon. Albatross, now less numerous, were being replaced by fulmars, shearwaters, and petrels of several species. The ship's speed had been cut down to five knots to allow the *Merrill,* which had dropped behind during the storm, to catch up. But when the *Merrill* reappeared after a few hours, the cruising speed of our ship was restored to 11 knots.

Icebergs increased as we progressed southward, and then great fields of floating sea ice appeared. Re-entering the region in which the sun never sets, we crashed through broad floes of sea ice averaging 20 feet or more in diameter and apparently four or five feet thick. Small icebergs protruded above the surface, bobbing up and down with the swells created by our progress as the ship, with its powerful engines, charged ahead. Two killer whales joined us in an area of open water, arching forward in great bounds, their huge, crescent-shaped dorsal fins raised high. We were not far from Cape Hallett and looking for the snow-covered mountains of the Victoria Range.

The floating ice was becoming denser, the cakes or floes now covering 80 or 90 percent of the surface. But the ship with its heavily reinforced hull was still crashing ahead, making close to 10 knots with only occasional jars when it hit a particularly large and heavy floe that refused to crack quickly. The *Merrill,* following along in our trail of shattered ice cakes, was now only 500 meters behind and holding up well.

As we crashed ahead into the denser and heavier pack, the petrels and other flying birds disappeared and were replaced by penguins, both the Adelies and Emperors. These would just stand out there on the ice and stare at us as though bewildered by this huge, noisy creature, crashing into their peaceful domain. Finally, somewhere off Cape Hallett, we hit heavy, solid pack ice and were slowed to a halt. Then began the slow, tedious process of breaking or 'cutting' ice—hauling off, backing up a boat length, and finally revving up the engines to 'give them the gun' that served to carry the whole 9,000-ton ship up and over the next boat-length of pack. Slowly the great ship would then settle down by its sheer weight to the floating level. Over and over again this slow and tedious process was repeated, each forward plunge consuming 10 or more minutes of time. Little wonder that ice-breaking is not a popular occupation with Navy personnel!

Although the pack was almost continuous over large stretches, there were still bodies of open water frequented by killer whales and small groups of Antarctic Petrels and the strikingly beautiful, ghost-like Snow Petrel, which was solid white except for a beady black eye. The pack was also broken into great blocks or sheets by long, gentle swells that moved them slowly up and down. I estimated that these swells might be 400 or 500 feet in wave length and perhaps several feet in height, the slow movement creating the long and irregular cracks that broke and fitted the floes together like pieces in a giant jigsaw puzzle.

On December 28, there was great excitement on board! The *Merrill* had be-

come icebound and could not move. With some danger that she might become frozen in for weeks or even months, the *Glacier* maneuvered into position. A 3-inch steel cable was brought out and attached to the 8,000-ton *Merrill's* anchor chain with the intention of pulling her free. The *Glacier* tugged with all motors running at full speed, then the huge cable snapped, tearing off a section of the *Merrill's* flight-deck just as she broke free. But now she had been set in motion towards the *Glacier.* Uncontrolled, she crept up on us, and before anyone could respond, she slammed, or better, crunched into the starboard stern of the *Glacier,* doing considerable local damage. Frantic radio messages between the Navy base at McMurdo and the *Glacier* finally concluded that the total damage was minor and that both ships could continue on to McMurdo.

As we cruised on past Cape Evans and Cape Royds, much of it now in open water, Adelies were swimming in large groups of several hundred birds, giving us a marvelous opportunity to watch their porpoising feats as, often in synchrony, they leapt into the air in long, looping vaults.

Back at McMurdo we spent the last weeks of the 1962–63 season calculating distances and cruising angles of those penguins that had shuffled off into the void, checking out our gear, and closing down the 1962–63 program. With the vague hope that we might return for another season, we also discussed preliminary arrangements and plans with the people in charge of the departments where we might need suggestions or materials.

Calcutta and the Ganges River Delta

Emlen did indeed return to Antarctica for a second season, this time for the 1964–65 winter. During the 1964 summer and fall, however, Emlen's schedule allowed for extensive travels since he would not be departing for the Antarctic until late fall.

"I had a prospective research project to explore in East Africa," he wrote, "so I could take off in August for a few weeks with plans to join Jinny in New Delhi in late September. From there we would explore a little of India together then continue on to the Malay Peninsula. This circuit would land us finally in Darwin, Australia. From there Jinny would proceed to explore the Australian continent . . . . Meantime I would proceed to Christchurch and on to the Antarctic."

One of the stops in India was Calcutta, where the Emlens were met by two of his "recent graduate students from Wisconsin—George Schaller, who had now completed his studies on gorillas in Africa and orangutans in Borneo, and Charles Southwick, who was collecting population data on small mammals and rhesus monkeys in India . . . ."

> After visiting with George and Chuck and catching up on their recent experiences and research activities, I wandered out into the crowded brushland surroundings of Calcutta with Chuck to catch a glimpse of the local avifauna—mynahs, drongos, bulbuls, Black-headed Orioles, Green Barbets, several species of sunbirds, and a Long-tailed Pheasant Cuckoo. People were everywhere in this Indian version of suburbia, wandering over the network of footpaths that irregularly connected the hundreds of small mud shacks that were their homes. Women were scrubbing clothes in trailside pools, while small boys crept about in the underbrush threatening us with slingshots. It was not hard to believe that Chuck would have his troubles trying to

maintain small-mammal traplines in the jungle . . . .

Our stay in Calcutta also included a visit to the city's notable, large, and well-maintained zoo, of which a Dr. Lahiri, another friend of the Southwicks, was director. Outstanding among the zoo's exhibits were an excellent collection of waterfowl, appropriately emphasizing local species from the Asian continent, and several gorgeous specimens of white (albino) tigers, animals that had been captured in the nearby mangrove forests of the Ganges delta, not far from Calcutta. Particularly striking for me, however, was a roosting colony of over a thousand giant fruit bats that had taken up residence for their daytime resting period in a grove of trees near the zoo's waterfowl area. Alert during at least portions of the daylight hours, these heron-sized creatures were unconcernedly flying about overhead as we watched from the ground below.

Learning that I was Dr. Southwick's professor from Wisconsin, Dr. Lahiri proposed that Jinny and I and the Southwicks accompany him on a three-day excursion he had scheduled to the Sundaban Forest Reserve. A 2,000-square-mile tract of mangrove forest, this reserve encompassed the tidal delta of the Ganges River. It was noted for its wildlife and was one of the few retreats for surviving tigers in southern India. On our rather tight schedule no time could be lost, so the next morning we taxied the few miles to Port Canning and boarded a Forestry Department diesel launch for an exploration of the delta . . . .

Coursing downstream we passed through 10 or 15 miles of low, flat, irrigated land and several crowded riverside villages before we reached the forest boundary. Here the scenery changed abruptly from open irrigated fields to low dense mangrove forest. Rarely more than 15 or 20 feet in height with a sparse overhead canopy of Phoenix palms, these trees would scarcely be recognized as a forest by a European or American traveler. But this was the wilderness home for much of the remaining wildlife of southern India. We were essentially alone on the river, for the reserve was closely patrolled for poachers and woodcutters.

The control of woodcutting in an extensive stand such as the Sundabans may seem a strange concern for an Indian forestry officer. However, this tract of mangrove was, in a sense, the equivalent of a Texas oil field for an Indian population dependent on sticks, twigs, and cow dung patties, picked up around the shanty, for a family's day-to-day fuel requirement. The principal job of the local forester was thus to supervise and regulate a few dozen firewood entrepreneurs who came down from the cities with their crude little sampans to load up as many branches and sticks as they could pile on their limited deck space . . . .

Little Cormorants were the dominant waterfowl along . . . quiet stretches of slowly flowing, brackish water, but Cattle Egrets were also present in large numbers, and an occasional yellow-footed Snowy [Little?] Egret added glamour. Long-billed Curlews, migrants from Siberia, were there in abundance, and small flocks of the lesser shore birds added variety. Monkeys, wild pigs, and several species of South Asian deer ventured out onto the flats from the sheltering forest edges, while Ganges dolphins, those strange narrow-headed relatives of our sea porpoises, arched and porpoised in the water nearby. Especially notable were the climbing perch, small fish with bulging eyes that scrambled up into the mangrove branches on short, leglike fins or jumped off to safety like frogs when we tried to catch them. Tigers, man-eaters according to published records, were present, and Dr. Lahiri was able to show the characteristic broad paw print to Jinny and her group, but I missed this. We were constantly on the alert for tigers, and the tales of the licensed wood-

Figure 8. Thatched hut by a dike on the Ganges River, near Port Canning, India, 1964. Photo by J. T. Emlen Jr.

cutters were full of their encounters with them.

Our main goal, however, and the announced purpose of our trip was to count the huge nesting colony of Open-billed Storks, estimated at 30,000 birds near the center of the reserve. Dropping anchor and proceeding in an outboard dinghy to the high-tide riverbank, we walked back for perhaps half a mile into the dense mangrove to a dry spot where our hosts had erected a little scaffold of branches as an observation blind.

Before us lay the birds, thousands of them crowded into the tops of the scrubby mangrove trees on about 10 acres of terrain. The colony was dominated by the Open-bills, large, long-legged, white-plumaged birds in which the base of the bill is prevented from closing by a downward curve in the upper mandible and an upward curve in the lower mandible. More than half of the nests belonged to these storks, but at least eight additional species had nests in this colony including about 5,000 Little Cormorants; 100 Cattle Egrets; several hundred Purple Herons, Little Egrets, and Paddy Birds; and smaller numbers of White Ibis, night herons, and anhingas. Three pairs of Pallas' Fish Eagles had nests in nearby trees and may have been taking advantage of the rich harvests made available to them by their long-legged neighbors.

Most of the storks had hatched. It was impossible for me to judge how many storks were present, but I concurred that the estimate of 30,000 adult Open-bills was not far amiss. The storks apparently were feeding largely on snails gathered in the forest, for I had seen relatively few of the storks with the herons and cormorants along the river's edges.

On our return to Calcutta and our last day there, a trip to an animal market with Chuck Southwick brought further surprises. The market visit also brought a clear warning lesson that the scope and seriousness of the world trade in wild

birds cannot be ignored. Hundreds of large cages, each holding a hundred or more finches, lined up on feces-encrusted perches, were piled up at the market entrance. Behind them on long shelves were piles and rows of medium-sized cages, which were crowded with parakeets, doves, and an assortment of wild pigeons. Songbirds—mynahs, bulbuls, and a variety of fruit and nectar-eaters, sunbirds, flowerpeckers, Fairy Bluebirds, rollers, thrushes, Glossy Starlings, etc.—were squeezed into tiny cages in rows on shelves, apparently destined for the small cage bird trade. On the floor were heavy wire or iron cages containing hornbills, pheasants, ducks, and a variety of middle-sized mammals—macaques, gibbons, squirrels, mongooses, fruit bats, civets, porcupines, small deer of several species, a leopard cub, and a tiger cub. Species in these floor cages were presumably headed for zoos in some remote city in the civilized world.

This was, we realized, just one animal market in one city in the Indian subcontinent. We were to see others in the weeks ahead. We had no idea—nor could any of the dozen or so caretakers in attendance tell us—just where this amazing assemblage of creatures had come from nor where they were headed. It was the size of the operation and our realization that there were many other markets like it in Calcutta and elsewhere in southern Asia that alarmed us.

Many thousands of rhesus monkeys were and are, of course, exported from India for medical research in America and Europe every year. This has been a personal concern for Chuck who had for years held key posts in the U.S. Government administration focusing on the supply aspects of wild primates for a burgeoning demand by the medical profession. As a result of supply controls, special legal provisions for safe transport have been established for these few 'valuable' species, while the survival of the remaining wild species is left to the local and essentially unrestricted traders in wildlife resources. Some progress has been made since the 1960s in controlling this destructive trade, but it remains a real threat particularly to species now classified as endangered. It will presumably remain a drain on the world's fauna as long as a ready source continues to supply these markets.

Should we deny the children of India the few pennies they can earn in their own country by spreading a coat of sticky bird lime on twigs behind the family shanty, or the thrill they get by snaring a few elusive voles and shrews in neighborhood brush piles? For that matter, need we deny their fathers or their uncles, often ingeniously equipped, the opportunity to snare a few larger mammals and birds in the surrounding forests? Commercialization of such activities is where the problem lies, and this is where the controls should and must fall. But can we in far-off America expect this when we can't control the commercialization of endangered resources in our own back yard?

The Second Antarctic Trip

After adventures in Bangkok, Kuala Lumpur (on the Malay Peninsula's west shore), and in Singapore, the Emlens moved on to Darwin, Australia. Here, John bade farewell to Jinny and headed for the Antarctic and a rendezvous with Richard Penney. Emlen and Penney were determined to find "the definitive answer to the Adelie Penguins' secret of navigation and homing." This would be Emlen's last trip to Antarctica.

This time about 40 penguins were brought in from the Russian base at Mirny and from Cape Crozier, with releases planned "from our now well-established 80- by 180-degree position on the ice shelf, and finally releases

from a sea-based ice floe located offshore to the north of Cape Crozier, and from the South Pole on Antarctica's central highland." On or about 5 November 1964, the Emlen party arrived at Mirny, and here, after a big breakfast of steak, ham, cheese, and salted fish, they departed for "Fulmar Island."

Hopping aboard "a big, motorized scow-sledge with six of our black-clad Russian companions, we chugged down to the shoreline about a mile away and across a narrow channel of heavy sea ice to Fulmar Island where there were several thousand of our familiar Adelie friends. Both sexes were represented, but with a little instruction we got across to our friends that we wanted only the males. Selecting the larger individuals and, where possible, birds displaying the distinctive ecstatic posturing, we had the 40 boxes filled in less than an hour and drove back to load them on our C-130."

The trip to McMurdo that followed took six hours, and here Emlen was met by David Thompson—the last student, as it happened, to receive a Ph.D. under Emlen. In the subsequent weeks, they released "dozens of Adelie Penguins from our Quonset hut at the 80- by 180-degree ice shelf site, alternating Crozier and Mirny birds. Their responses to our repeated questions were clear. The Crozier birds oriented north-northeast, just as the Crozier birds had done in 1962, the compass direction that would take them to the sea at the foot of the ice shelf. The Mirny birds just as consistently headed northwest, the direction that would lead them—if the birds were at the Russian base—straight off the Mirny shore into the open sea."

> When the sun was shining there was no question what direction each bird would select. It was the direction that we had predicted in December of 1962, after our Victoria Land releases had suggested that the initial escape direction for all penguins finding themselves stranded on an unfamiliar terrain should be outward, towards the open sea from their home rookery.

Figure 9. Transporting Adelie Penguins captured near the Russian Antarctic base near Mirny for eventual release 1,000 miles distant on the Ross Ice Shelf. Photo by J. T. Emlen Jr.

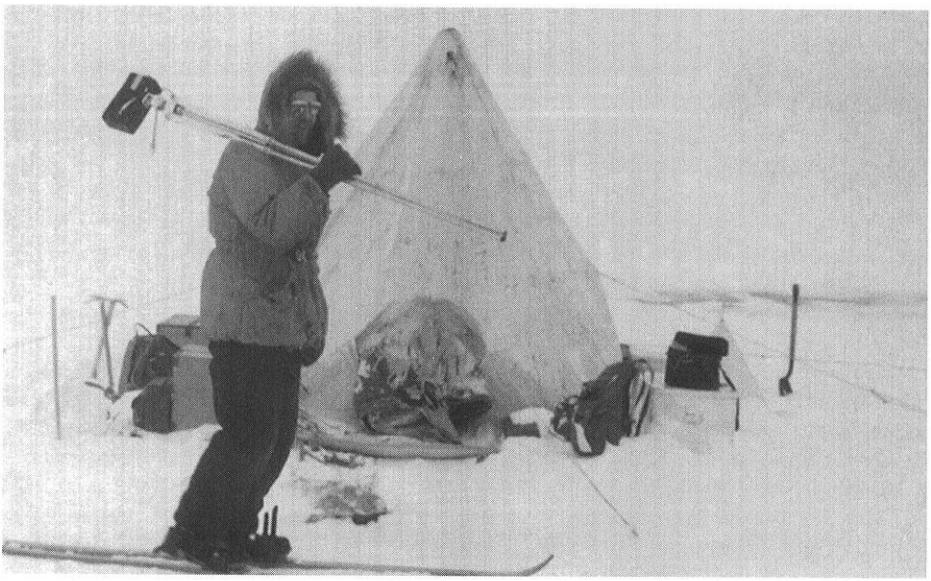

Figure 10. Emlen at penguin release site, 80 miles inland on the Ross Ice Shelf, Antarctica, where numerous releases occurred during 1962–1963 and 1964–1965. Photo by Richard L. Penney.

But beginning in the second week of releases, and increasingly in the third week, there was a new and perplexing wrinkle in the behavior of these birds. While the Crozier birds maintained their north-northeast direction, the Mirny birds were apparently shifting their departure orientation clockwise from northwest to north-northeast! What could this mean? It appeared that with the passage of time, just two to three weeks in this case, those birds brought a quarter of the way around the world's circumference were adjusting their interpretation of the sun compass to this new longitude.Such an idea would require a basic reinterpretation of our whole theory, but it would be an important one if we could prove that it was valid. We had already expended most of our Mirny imports, and we simply could not face the NSF with still another request for funds, nor would we really want to commit ourselves to extended careers of just tracking penguins. But, worst of all, time was again running out! With only two weeks to go, we had to turn our attention to our last two planned releases.

So, with limited time available in this our last season in Antarctica, we turned our full attention to that critical floating sea-ice release experiment offshore to the north of Cape Crozier and to the final release at the South Pole. We found that special permission must be granted for the sea ice project by the local McMurdo authorities, not only for our safety, but for the safety of the plane that would be used for the landing. Could the ice support the weight of the plane as it landed, and could it even support Rich and me, the experimenters?

In preparation we were requested to accompany a constellation-photo plane in a five-hour flight over the Ross Sea, a thrilling and novel experience for us. Cruising back and forth surveying tabular bergs up to two miles in diameter, our pilot and an ice-reconnaissance expert explained what little is known about floating sea ice, the type that we would be camping on. Ice floes are apparently

crudely classified in terms of five characteristics: size (up to about eight square miles in the really large, tabular floes), thickness (recognized by color from the air—from white, the thickest, to black, the thinnest), extent of ridging (from heavily ridged to smooth), height of ridging (estimated directly in inches), and density of the pack (percent cover on the sea as estimated or photographed). Softness, our particular concern, apparently could not be evaluated from the air and was not estimated.

Despite the limited extent of available knowledge on sea ice, our little two-man expedition was finally approved, and we were flown by helicopter out to the USS *Glacier,* the ship that I had accompanied on its icebreaking mission into McMurdo two years before. The personnel aboard had changed considerably, and this time we were welcomed warmly and shown to comfortable quarters and a good meal.

After a good night's sleep we were ferried across to our selected ice floe in the ship's two helicopters and dumped out on a sizeable (maybe ten-acre) whitish tabular floe with our camping gear and our boxed birds. Chopping a small hole with an ice axe we estimated the ice thickness below our selected camp site as 10 to 12 inches, adequate for our safety according to the ice-reconnaissance experts. Bill Sheville, the Antarctic whale specialist, had described for us just how killer whales manage to detect and capture seals (and/or humans) on the ice surface by simply locating their silhouettes against the sky. We had to assume, of course, that Bill was kidding when he included humans in that generalization.

Having unloaded us and our gear, the helicopters circled back to their base on the icebreaker below the horizon to the northeast. And there we were, afloat in the middle of the Ross Sea! Much of the surface around us was gray ice, "soft" according to the experts, but just soft enough to be dented slightly by the heel of my boot. Ice ridges and pressure blocks were low, and there were no open water leads within a hundred yards, so we were safe. The surface temperature must have been above freezing for there were small puddles of water here and there on the ice surface. A few hundred yards away were larger pressure ridges with ice blocks irregularly pushed up to as much as a foot or two by the movement of the floes.

We quickly set up our abbreviated transits and within an hour had released our first bird. The sky was still overcast with the sun only intermittently visible, but a broad area of blue sky was visible to the north, and sunshine soon dominated the whole scene. It was actually warm as we sat there on two emptied penguin boxes in our quilted pants and jackets. We worked continuously, munching peanuts and chocolate bars between releases.

The first bird failed us and just lay down to sleep only 30 yards away. But from that point on the birds performed well, giving us a clear record of their preferred direction before they disappeared in the jumble of ice blocks and pressure ridges at distances of 300 to 800 yards to the north. We got records on 13 birds. The mean direction was northeast—clearly away from the home direction of Cape Crozier but following the same northeast to north-northeast directions chosen by our other releases.

At half past nine in the evening we released our last penguin and tried to contact the icebreaker. We failed, but actually we were glad for that failure for we had become enamored of this beautiful spot seemingly in the 'middle of nowhere.' Pulling out our sleeping bags and spreading them on the ice, we lay there gazing up into the sky. Rich fell asleep and within minutes was 'a thousand miles away.' A pair of Antarctic Petrels in their ghostly white plumages drifted overhead as the wind dropped to a dead calm. Suddenly, for the first time in my life I realized that the whole world of sound was completely gone from my

consciousness. I strained my ears to pick up even the slightest whisper of a breeze, but there was none! The sheer beauty of that silence, that absolute silence, swept over me. It was an experience so beautiful and so rare that I shall ever be searching for its recurrence. Chances are, I'll never be lucky enough to encounter it again, at least in this world.

Back at McMurdo, we determined our location through astronomical measurements. The site we had picked on that drifting slab of sea ice was, at the time of our releases, 75 degrees 31 minutes south latitude and 170 degrees 19 minutes east longitude. That placed it 125 miles north of the penguin rookery at Cape Crozier. By heading northeast our experimental birds had done just what we had predicted: they headed outward towards the open sea in the opposite direction from their home base at Cape Crozier. Friends at the rookery reported that at least 15 of those birds did make it back home within two weeks, having somehow received the corrected signals, but when and how they did it remains unknown.

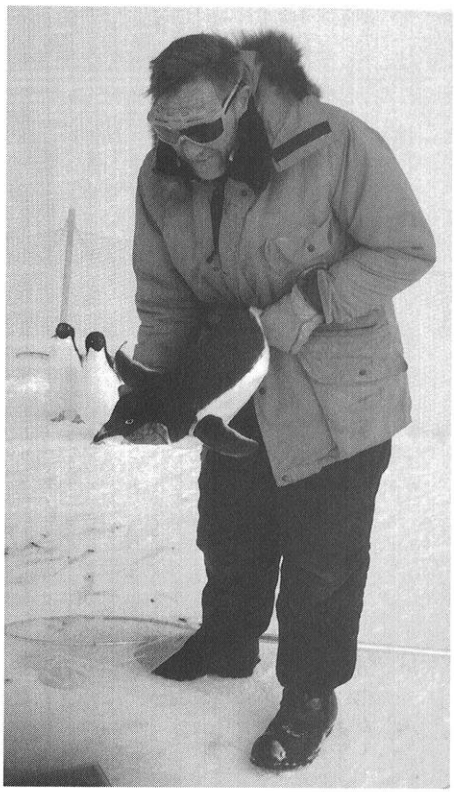

Figure 11. John T. Emlen Jr. about to release Adelie Penguin for homing experiments on the Ross Ice Shelf, Antarctica, 1964. Photo by David H. Thompson.

On to the South Pole

On December 3 we made our last pickup of penguins at Cape Crozier, transporting them by plane to the McMurdo airstrip where on the next day we would pick them up for transport to the South Pole. With all lines of longitude radiating from this hub of the southern hemisphere, we predicted with considerable confidence that our birds would again select the same northeast or north-northeast grid directions that all our Crozier releases had chosen from the Ross Ice Shelf, Byrd Station, Victoria Land and now, just a few days ago, the sea ice north of Cape Crozier.

This time, however, we would have a new problem to face. We would not be able to just dump our birds out on the ice at the South Pole. To do that with more than a thousand miles to travel in this, the coldest climate in the world, would be murder. After allowing each bird to give the needed information for his directional preference, we would thus have to run him down and transport him back by air to his home at Cape Crozier.

Dave Thompson, who had joined our group as a third member, was delighted with this assignment, for snowmobiles were new in 1964 and great fun to operate. Dave was prone to explore, however, and I was worried that he could easily vanish over the horizon, just disappear behind one of those 4-foot sastrugi—wavelike irregularities in the

ice formed by the wind—or get lost in a whiteout. Getting lost can be a real problem even when there are no whiteouts if you're at the South Pole!

Our releases went smoothly and presented no deviants except for one bird that just lay down and went to sleep in the −20°F temperature, unwilling to wake up and move. He would wake up only for that free airplane ride he would be offered back home to Cape Crozier. All the others knew just where they wanted to go (midway between northeast and north-northeast), and they wasted no time picking that direction and yielding to the chase-down and capture in Dave's snowmobile.

With our penguins having completed their assignments, it was our turn to have some fun. The precise location of the geographic South Pole lay a half mile to the west. Here, the geographic hub of the southern hemisphere was marked by an informal 15-foot flag pole, a flag of the State of Idaho (obviously raised by some loyal citizen of that state), and an igloo laboriously built by someone who must have thought that such objects were appropriate for the scene even though it was ten thousand miles from Eskimo land. Here we walked around the world a few times just to be able to say that we had performed that feat, and I laboriously got up to a handstand and had Rich take a photo of me to be reversed on the print and labeled, "Atlas holding up the earth . . . ."

Nearby was the actual South Pole headquarters. A maze of tunnels had been cut into the surface ice layers providing accommodations—mess halls, libraries, and lounges—for the residents and visitors. Temperatures rarely rose above −20°F outdoors and, when often accompanied by strong polar winds, were essentially unlivable except for adventurers appropriately clad.

One day while we were there, however, on hearing that they, the local residents, would be visited by a couple of shrinks (psychologists from the States), four of the enlisted men decided to have some fun. Learning the ETA of the scheduled flight they set up a cardtable out on the ice at the end of the airstrip then jumped into hot showers. As the great plane skied to a landing, they dashed out completely naked, took seats at the table, and dealt themselves four hands of bridge. Their bodies steaming in the frigid air, our heroes continued their game as their intended audience, scarcely catching their breaths, hustled on to the comfortably heated airport accommodations inside. Disgusted at this lack of response, the pranksters dashed back to their showers, voicing their evaluations of the profession of their uninvited and thoroughly unappreciated guests.

Figure 12. Emlen "holds up the earth" at the South Pole, December, 1964. Photo by Richard L. Penney.

A Change in Health, a Change in Direction

When Dr. Emlen returned from his Antarctic trip in 1965, an unexpected development affected his career and life.

Adventures are not always just fun and excitement, and as I emerged in 1965 from my second trip to the Antarctic, I was plumb miserable with strange pains in my upper back and chest. I had first noticed these symptoms at the South Pole. I assumed that they were probably associated in some way with the 10,000-foot altitude of that station and would vanish as soon as I got down closer to sea level. But with time they got worse, and I could not shake them off even with five days at Milford Sound or on our long and peaceful flight home across the Pacific.

Back in the U.S. I continued to attend scientific meetings and in desperation even tried a chiropractor for my back. One day out at the University [of Wisconsin-Madison] Arboretum, however, I collapsed, and an ambulance had to be called to take me home. Then, sometime in early summer the doctors came up with a diagnosis: arterial disease, and a prescription: heart surgery.

After seeking a second opinion from noted cardiologist Helen Taussig, Emlen avoided surgery for at least nine more years, until 1974, by which time a much-improved procedure had been developed. Extensive bed rest was prescribed, and he and Jinny escaped to Tucson, Arizona, where they stayed with friends for eight months during the fall and winter of 1965.

Our new desert home . . . the Triangle-S Ranch, consisted of a cozy cluster of three simple cabins operated by an elderly couple at the desert's edge . . . . Within a few days we had set up an elaborate array of feeding stations for the local birds and ground squirrels. This population would provide me with the essentials for a series of hastily contrived experiments on spacing and crowding tolerances that were fun if scientifically unimpressive.

Just across the road to the north was a small area of essentially undisturbed Sonoran desert with saguaros, palo verdes, and chollas. There I could settle back on a sandy knoll and drop off to sleep in the desert sun while Curve-billed Thrashers sang to me and Gambel's Quail called from the nearby shrubtops. One day I was aroused from my reveries on that knoll by rustling sounds. Glancing up, there was a 15-inch gila monster, that notorious poisonous lizard of the desert scrub, slowly stalking off only a few feet from my head. Excitedly, but silently so as not to arouse my visitor, I responded to this brief but genuine adventure, my first real one in over a year. The thrill of that brief encounter renewed my sense of well-being and catapulted me onto a new and elevated plane of recovery.

Emlen resumed his teaching duties at UW-Madison in 1966, returning to his "regular fall course in behavioral ecology and a one-hour seminar in behavioral dynamics with little trouble except that I had to perform from an easy chair instead of a standing position in front of the class."

My big concern, however, was that the medics were telling me my health would force me to migrate south for the coldest months of the Wisconsin winter each year! For practical considerations I could remain through the fall semester, but then I must plan to leave town promptly. I would thus have to give up all my laboratory research projects on campus, projects that had become an important part of my research activities in recent years. Maybe, I rationalized, this would not be completely disastrous for a guy who, after all, had started his career in the field and whose principal biological heroes had been naturalists like Charles Darwin and Alfred Russel Wallace.

So, following doctor's orders, he migrated south during the subsequent

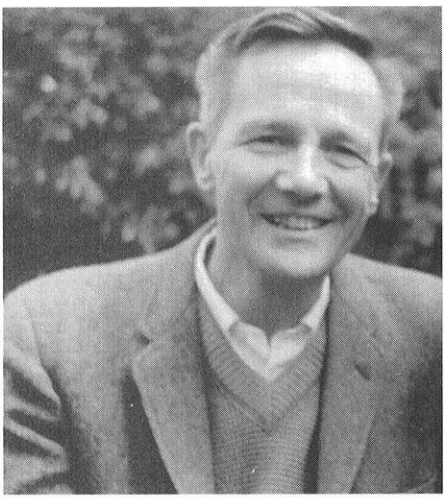

Figure 13. Professor Emlen back on UW-Madison campus, fall, 1966. Emlen Family Archives.

winters. In January 1968, he initiated yet another research project—this time in Florida and the Bahamas.

> I wanted to compare the bird populations of the slash-pine forests of the Florida peninsula with those of the strikingly similar Grand Bahama Island, the nearest of the offshore islands to the east. Combining the names of the two study locations produced the name—Flabah—which I used for the project.
>
> Despite their close similarities in vegetation and their spatial proximity, there was one major difference between the two areas. Bird population densities on the island were more than twice that on the mainland. Why should this striking difference exist and persist when the two habitats were so similar and stable? This would be a question that I could examine over the next few years by repeated visits to matched habitats at the two sites. Five years later, in 1972, Robert MacArthur of Princeton University and Edward Wilson of Harvard would provide a reasonable explanation for the high population densities frequently encountered on islands. But, as of 1967, there were no good observations comparing island populations with matching peninsula populations.
>
> After locating and surveying study sites on Grand Bahama and the Florida peninsula in 1967, I was ready to launch a serious research program the following spring when my improved health would presumably permit the extensive daily foot surveys that would be required of such a study.
>
> My good friend Harold Mayfield of Toledo had called my attention to an enthusiastic and competent amateur ornithologist, Dorothy Rand, in Freeport, Grand Bahama. Dorothy's husband owned a half dozen attractive rental cottages in a private enclave on the island. One of these might be available for occupancy by Jinny and me, he thought. We contacted Dorothy and her husband, and after a visit they offered us not only one of those cottages but a Chevy roadster for tooting around the island.
>
> In Florida through my friend Bill Robertson, head naturalist at the Everglades National Park, we were offered an old but adequate trailer in the government trailer park near Homestead. Between these two sites I could shuttle back and forth every two weeks by air to compare the two bird populations through the spring breeding seasons of 1968, 1969, and 1970. With these arrangements I was able to amass many hundreds of hours of field observations.
>
> Grand Bahama, lying just 60 miles to the east of Miami, is an elongate, 60- by 10-mile strip of dense, essentially monotype, irregularly cut-over carib pine forest. Formed on a base of porous oolitic limestone, it rises no more that six feet above the high tide sea level. When we were there, the level terrain was undeveloped except at the west end, where the town of Freeport stood with its garish assemblage of gambling casinos and luxury hotels, plus a small but rapidly expanding maze of cottages and pleasure-

boat canals. A band of low mangrove-covered tidal flats extended for several miles along the north shoreline.

The native avifauna of Grand Bahama was dominated (25 of its 32 species) by species of direct or secondary Antillean origin. Only seven of its extant species showed close (subspecific) affinities with those of continental North America. This heavy dominance of Antillean forms indicates that Florida, while only 60 miles away, has contributed little to the Bahamian avifauna in recent decades, and probably recent centuries. Only two continental species, the House Sparrow and the Mourning Dove, showed clear evidence of recent invasions from the continent. The House Sparrow, an import from Europe, clearly did not make it to the island until after it had spread to Florida in the late nineteenth century. The Mourning Dove, apparently the only other member of the Grand Bahama avifauna ever to have made that apparently simple crossing from the mainland, did not arrive until the early decades of the twentieth century. This nearly complete absence of any range extensions from Florida eastward across the narrow Florida straits until modern times is a perplexing phenomenon. Why should the dozens of lowland, pine-inhabiting species of Florida hesitate to cross that narrow, open 60-mile channel to occupy a terrain closely matched in all physical climatic and habitat features to their home on the continental mainland? I hope that this perplexing and elusive question will again be challenged by some naturalist adventurer in the near future. To me, and many others like me, it will remain an open mystery crying for an answer until that person appears.

The Emlens returned to the Bahamas for three years, and found time to visit some of the islands that comprised the Bahamian Archipelago.

One of these was the island of Inagua, the southernmost of the Bahamas, and only a short distance north of Cuba. Turned over to the commercial production of salt by solar evaporation of sea water, the island was largely uninhabited, a low barren plain of sand dunes and heavily concentrated saline ponds. The glistening conical peaks that greeted our eyes when we first approached the island from the sea were, of course, not snow-capped peaks as they appeared, but little mountains of glistening white salt.

Hot and dry, the coastal areas of Inagua were home to many tropical sea birds including the spectacular Yellow-billed [White-tailed] Tropicbirds. But the major attraction of Inagua was a national preserve established to protect a large nesting colony of Antillean [Greater] Flamingos. Our hosts on the island were the Nixon brothers, official wardens of this impressive bird sanctuary. My first encounter with flamingos had been in 1928 when my father and I visited the famous colony on the Isle de la Camargue in southern France. What we saw on Inagua lived up to—and even surpassed—my memories of that historic occasion. We drove out across the broad, open flats in the Nixons' ancient and salt-encrusted Land Rover towards a row of tiny pink specks that, as we approached, proved to be the flamingos. Hundreds of them were parading sedately back and forth in the shallow water, occasionally leaping into the air with pink wings flashing and spindly legs dangling. Apparently no eggs had yet been laid that year, but the flamingos' high, mud-rimmed nests were everywhere, and the birds' spectacular nuptial displays were at their height.

By spring, 1968, another graduate student project afforded yet another overseas trip; this one to Japan and the study of Japanese macaque communication by UW-Madison student Gordon Stephenson. Stephenson had

been invited "to observe several of the twenty or more 'new' monkey colonies. Reflecting a revived post-war interest in their native primate, the Japanese had started a provisioning program at various sites on the islands. With this artificially augmented food supply, monkey numbers at most of these colonies had—by 1968—increased spectacularly. It was at one of these colonies near Kyoto that Gordy would be stationed . . . . The owner and manager of this colony, a Mr. Iwata, would be our host. Dr. Kawabe, a young professor at Osaka City University, would be our tour leader."

Among Emlen's many remembrances from this trip was a rather humorous one that followed a ferry ride to Beppu on Japan's southern island of Kyushu.

> After the ferry docked the next morning in the small island city of Beppu, we proceeded with Kawabe to our hotel and the attractive rooms he had booked for us there. As we gazed out the window of our bedroom there, we spotted a huge, gilded statue of Buddha, much like some of those we had seen a few years before in Thailand. "What is that, Kawabe?," Jinny shouted, pointing a finger towards the huge statue on the hill across the valley. "Is famous shitting Buddha," explained Kawabe, referring to its erect sitting posture.
>
> Spontaneously we Americans, all four of us, broke out in loud guffaws. Kawabe was clearly puzzled at this response, and an explanation for our sudden and apparently rude outburst was obviously required. I was elected to provide that explanation as our group broke up in embarrassment and scattered to various parts of Beppu. Kawabe and I strolled down to the sea wall at the Beppu Harbor front. There I told him that his pronunciation of the English soft *s* had been heard by us as an *sh*, completely changing his meaning for the posture of that giant Buddha we had seen over there on the hill. Kawabe saw the point and laughed, confirming that I had succeeded in my mission of providing an explanation that was satisfactory to him as well as to me. How easy it would have been for serious misunderstandings to arise from such completely innocent slips of the language and of pronunciation!

A Full Itinerary: Africa, Baja, Mexico, and Back to Africa

The Japanese trip proved to be relatively easy for Emlen, and encouraged by this he and Jinny "were chafing to return to Africa and the world out there beyond the U.S. borders." So, at the end of the fall 1969 semester, in December, they set out for South Africa's Natal Province, where another of Emlen's students—Norman Owen-Smith—had recently completed his field research on the white rhinoceros. After a brief visit they ventured north and inland, eventually entering Tanzania's "famous big game country." Chief among the game preserves was the Ngorongoro Caldera, "the jewel of Africa's wild game preserves." Emlen recalled it fondly.

> A giant among calderas wherever in this world you may travel, the size and symmetry of this volcanic crater is unique entirely aside and beyond its wealth of wildlife. We had only one day for Ngorongoro, but that day will be remembered forever as a highlight in our memories.
>
> From our hotel at the base of the outer rim we climbed 2,000 feet in a Land Rover to the rim of that amazingly uniform mountain ring, then stopped before plunging down an equal distance to the 800-square-mile, grass-covered crater

floor on which rested a 100-acre, salt-rimmed lake, dotted with thousands of pink flamingos. Several small dark green patches on this otherwise largely uniform pattern of bright green obviously represented small acacia forests on that predominantly grassland carpet.

On our way down, while still elevated several hundred feet above the calderas's floor, we stopped the car to take out binoculars and try to decide whether the fine speckling of brown dots spread out over the smooth green carpet could indeed be, as claimed, myriads of game animals. Gasping in wonderment we continued our descent.

At the edge of the broad caldera floor, we encountered a couple of Masai bomas, the cattle kraals of the local tribe, permitted in the park as a gesture to their partial tribal ownership of the land. Then we moved out onto the vast open plain of the caldera to skirt the shore of that salty lake that we had recently viewed from above. Almost immediately we began encountering game. On the open meadows to our right were zebras, wildebeests, gazelles, and ostriches. On the lake to our left were egrets, Black-necked Herons, Sacred Ibis, and an endless assortment of shorebirds, sandpipers and plovers in the nearby shallows. Ducks and geese swam farther out. Finally in the distance were flamingos, wading daintily back and forth in the deeper water offshore. As our binoculars scanned this richness of avian and mammalian life, further mammal species kept appearing—eland, kudus, hyenas, buffalo, rhinos, and elephants. Finally, partially isolated from the rest, we saw a pride of lions consisting of a central pair, two single males, four females, and at least two tiny cubs .... Our guide reported that the official count of resident mammals on the caldera floor that year was 14,000 wildebeests, 5,000 zebra, 4,600 Thompson and Grant gazelles, 400 elands, 100 rhinos, 50 lions, and several thousand miscellaneous other species.

Before leaving Africa we stopped off in Accra and the impressive city of Abidjan. In Abidjan, we took a room on the south of the seventh floor of the continental hotel. While seated there on a couple of comfortable rocking chairs, looking out over the city skyline to the east, we watched a small flock of heron-sized birds with slow, measured wing beats appear. Soon more and more joined them from the east until there were dozens, then hundreds, slowly winging their way westward. Applying our binoculars, we could see that they were not herons but large bats called flying foxes! More and more streamed in until the sky was filled with them. Apparently they were coming from some daytime roost down there in the city center.

The next morning we searched for that roost. We found it in a forest of tall trees in and around the central city square. There were not just hundreds or thousands, but tens of thousands, maybe even hundreds of thousands of the flying foxes. They clung in great clusters from the upper branches of almost every large tree in the central city area and in many additional blocks to the north and west as we explored the city. Dozens or, more likely, hundreds were in every cluster. As the sun rose, single individuals on the surface would flutter nervously and eventually peel off to join the departing throng. Amazingly, the sidewalks beneath these writhing masses of furry creatures were almost clean of droppings and remained so through the morning. But masses of bats remained up there squealing and chirping all day long. Then, shortly after half past six in the evening, a further massive exodus took place. We estimated that over a hundred thousand took off to the west, the same direction that we had seen them departing the evening before from our hotel balcony. This was a giant roost, greater by far in terms of both numbers and biomass than any similar gathering of animals I had ever

seen before in the great crow roosts of the U.S. or Europe . . . .

Trips to Baja California and western Mexico followed in 1972, with a return in 1976 to the Oaxaca area on Mexico's southern Pacific slope. But prior to that, Emlen's heart problems revisited him in November 1974, the year he formally retired from the University of Wisconsin. He ended up in a hospital in Stanford, California, where doctors performed coronary bypass surgery—a total of five bypasses—but this time "my recovery was rapid, and I returned to nearly full activity."

During the 1976 Mexican trip, the Emlens ventured to the coastal town of Puerto Escondido, near Oaxaca. Here, one enchanted evening, he recalled a memorable moment in wonderfully lyrical prose:

> After supper that evening we shed our shoes and strolled out to enjoy the gentle, rippling waves on the beach front. Each wavelet as it splashed ashore that evening was alive with phosphorescence, more intense than either of us had ever experienced before, a marvelous show of nature's fireworks! Then suddenly out of the surrounding darkness came a streak of light over the surface of the water. To our amazement it was one of those long-winged Black Skimmers silently cutting a swathe of fire along the water surface, my first-ever experience with one of these birds at night. I had actually never realized that these marvelous winged acrobats ever ventured out in the dark. But here one was, no doubt about it, in a marvelous illuminated display, cutting a long luminescent streak along the water surface. Back and forth, back and forth, it flew, leaving no doubt that skimmers may at times be nocturnal.

Another African trip followed in 1977 with stops at various sites in northern and western Africa, including a visit to Senegal:

> After a long and exhausting flight across the four-thousand-mile, east-west bulge of Africa, we landed in Dakar on the west coast. That evening after supper we found ourselves in a couple of comfortable chairs on a low balcony just above the sidewalk looking down on a bustling scene of colorful Senegalese life.
>
> Directly below us were dozens of noisy, gesticulating women officiating over tables of colorful yardgoods, fruits, and garden vegetables, while their babies and small children slept or quietly played on blankets thrown down on the sidewalk. The market proper a few blocks to our right was a large shed offering an endless array of vegetables and fruits, fish, miscellaneous seafoods, and flowers. To our left the streets and sidewalks were swarming with pedestrians, some of whom appeared to be considerably taller than others. We wondered why. Those high heads, we finally realized, were the huge bundles that many African women often used to carry home a variety of objects from the family wash to wooden boxes with household furniture.
>
> After a good night's sleep, we awoke to distant chanting—the voices of Mohammedan priests wailing their prayers and supplications down from the towers and rooftops around the city. Their soft mellow voices strangely and harmoniously blended with the crowing of a half dozen roosters, each wailing its individual sentiments to the gods of the dawn. Before long, those soft distant sounds would be drowned out by the discordant beeping and roar of the street traffic of Dakar.
>
> We were picked up at our hotel that morning by Gerhardt and Marie-Yvonne Morel, distinguished French ornithologists. They drove us out to the Langue de Barbaries National Park at the mouth of the Senegal River where Grey-headed Gulls and Caspian Terns had established a large nesting colony in a patch of sea-

grass among the sand dunes. Slender-billed Gulls and White Pelicans were also in evidence, and a compact flock of about twenty flamingos could be seen to the north along with a scattering of cormorants and Sandwich Terns. On one bank of the river were large flocks of migrant shorebirds and herons of several species. Reef Herons were dancing around in a shallow pond, reminding us of the similar antics of our North American Reddish Egrets.

Then, driving on through the desolate thornbush plains over which Wolof and Fulani herdsmen roamed, we came to a series of small Fulani villages. These villages could be identified by their distinctive, oval-shaped straw huts surrounded by thorny branches. Such branches provided protection against wandering hordes of browsing domestic goats in the essentially unfenced landscape. Irrigated fields of sugar cane dominated the fields outside of the town of Orstrom where the Morels had their attractive home and office (Office de Recherche Scientific Outre-Mer).

For the next several days, we drove along the south shore of the Senegal River. The land surrounding us was basically arid. However, six large wells, which had been dug by the government, significantly altered the countryside. From these wells irrigation canals spread out, providing water to support a rich cropland, in much the same fashion as the crops of the San Joaquin Valley of California also thrive because of irrigation.

Attracted to these vast African grain fields was the Quelea, the small sparrow-sized finch that I had first seen in Rhodesia about 20 years earlier. As in Rhodesia, natives here were authorized to kill these birds because of their heavy damage to crops. As a result, thousands were destroyed every year with only minor effect on their numbers.

Beyond the reach of the irrigation canals were the remnants of Senegal's domestic and native wildlife. Many of the Fulani tribesmen had moved on to the south. As a result we saw only small herds of the drought-tolerant cattle. Goats, however, were abundant through the scattered villages plus a few asses, horses and, here and there, a solitary dairy cow. Wild game—including giraffes and lions, formerly fairly common in the area—had disappeared from the area a decade earlier. Middle-sized game were represented only by one scrawny jackal in our week of exploration. Increased poaching and the drought were reportedly responsible for these disappearances.

Along the Senegal River, Gerhardt and another government official had established a bird population study area. This consisted of several plots of about 60 acres each. For the previous eight years these plots had been censused just once a month for two days, using what they called the Emlen census method. Following rows of regularly spaced, 3-foot concrete posts, Gerhardt or his partner walked those lanes with two specially trained native assistants walking about 160 feet on either side.

Marie-Yvonne, having been working on a major aspect of their 10-year study, was impressed with the European migrant birds that appeared every fall in the Sahel. She had found that these migrants varied tremendously in total abundance and species composition from year to year. These data were indeed impressive, and I encouraged her to publish a paper on her findings as soon as possible.

Two days later we said a fond farewell to Africa and set sail for Rio de Janeiro in South America, a new continent for us three thousand miles across the South Atlantic. That visit, however, was shortened by a series of attacks of dysentery, presumably acquired in Dakar before our departure. These problems finally led us to a tiny health resort, Colonia Tovar, in the mountains of Venezuela. This was an attractive site for our final recovery but not what we had been looking for

in the lands to the south of the Panama Canal.

No Rest For The Itinerant Ethologist

A trip to Hawaii in 1978 was followed by a much-anticipated flight to Bermuda in 1979 and a chance to observe the rare Bermuda Petrel (also known as the Cahow), at one time believed to be extinct.

As a small boy in our family's summer home at Pocono, I read with excitement of a mysterious nocturnal sea bird. At one time it had nested in large numbers on the little island of Bermuda in the Atlantic Ocean, far off the coast of Carolina. It was mysterious because it was then thought to have been exterminated by early sixteenth century Spanish settlers who had brought in great hordes of predatory rats, cats, and domestic pigs. Thus only a small number of specimens existed in the museums of the world, and as of the 1920s none had been collected over the preceding 300 years! Then, in the early 1950s Dr. R. C. Murphy, an ornithologist, and William Beebe, a naturalist explorer from the American Museum of Natural History in New York, made a discovery. They found that a few, apparently a very few, Cahows were still present in the old breeding areas out there on the eastern end of the island.

As of 1979, three nests of this extremely rare and highly endangered species had been located. A young ornithologist, David Wingate, a student at Cornell, had been designated as the official guardian of those survivors. A friend of David, I wrote him to ask if Jinny and I might come down to learn a bit about his project and, if possible, see one of those endangered Cahows. His answer was yes to both questions, so in January of 1979 Jinny and I took off for Bermuda to extend my interests in island and peninsular bird populations and maybe see a real Cahow.

Protecting the Cahows had posed quite a challenge to Dave. He recognized that exterminating all the rats and predators on hundreds of islets in a broadly dispersed archipelago would be impossible. Such extermination would also have unintentionally had to include the protected and beautiful Red-billed Tropicbird, a proven Cahow predator. David thus decided that the best and probably the only sure and safe approach to Cahow preservation would be to develop and provide a bunch of predator-proof Cahow nesting burrows. At the time of our visit Dave already had 25 concrete predator-proof nesting boxes out there on several of his Castle Harbor islets on the eastern edge of Bermuda where the Cahows had been observed.

So one morning we boarded Dave's rubber-bottomed Boston-Whaler and headed out across Castle Harbor with its antique, sixteenth century Spanish defenses against imagined British invasion. Landing on a small, steeply sloped grassy islet, we scrambled up to one of Dave's artificial burrows. Warning me to be quiet, he beckoned me over to peer down through the viewing window. There sitting peacefully on its single egg, was a Cahow, one of the few surviving members of a species that just a few decades earlier I had read was extinct. I gulped as Dave silently closed the window on a scene that I truly thought and believed had been relegated to the historical past, long before I was born.

From Bermuda, the Emlens flew south to Trinidad, where their first visit was to the Caroni Swamp, "only a few miles from the Port of Spain airport."

Each evening at this swamp, thousands of Scarlet Ibises fly in from the surrounding tidal wetlands to roost in the flooded mangrove trees. We could not afford to miss that sight, so hailing a taxi we drove

out to a boat dock and there boarded a 12-passenger outboard for the Caroni Swamp.

Visiting the roost was a terrific experience. On the broad, deep channels of the swamp we chugged along, flushing herons, egrets, and a variety of shore birds. Then, as twilight settled on the scene about seven o'clock, they appeared—the flame birds of Trinidad. Pink-plumed immatures dominated at first, but the brilliant adults were there as darkness deepened, first in fives and tens, then in hundreds, and finally in thousands. Alighting on the dark green mangroves, they brought to mind scenes of Christmas mornings in the old days in Madison when Jinny and I would lead the kids into the darkened living room to suddenly reveal the Christmas tree, in all its glory of glowing red candles.

Trinidad had a wealth of interesting tropical birds. But I had selected one group of species on which to focus on this trip—the lek birds. I had been introduced to the lek phenomenon in Africa in 1953 when I saw one thrush that displayed this intriguing behavior. Instead of just pairing off in the usual manner of most northern hemisphere species, the males of a lek species enter the breeding season in tightly organized social flocks or leks. There were half a dozen or more of these species on Trinidad, and I had promised myself to become acquainted with them. Son Steve had spent several years in Africa doing a thorough study of one African species, the White-fronted Bee-eater. Obviously I could not expect to do what he had accomplished in Africa. But perhaps I could catch a glimpse of a variety of lek behavior types that were found on this West Indies island.

Within the first hour at [the] Asa Wright [Nature Center, a biological field station on Trinidad] we had located the lek of one common species, the White-chinned Manakin, a small, brightly-colored, stubby-tailed songbird. Twenty manakin males were vigorously singing and displaying on the wing, just a foot or two above the ground on what was obviously the lek area. Within that small area each male had cleared a small, three-foot ground area of all leaves, leaflets, twigs, and even grass blades. Centered over this cleared area he was flitting while constantly singing. The song was a simple little ditty consisting of a brief, squeaky trill followed by a rattling mechanical noise and ending with a loud, explosive "krak," reminiscent of the loud sparks bursting from a green spruce log in our fire place at Pocono. This singing noise was continuous and intense except when Jinny or I trespassed over the boundary of the lek to force a temporary and local suppression of the clamor. We saw nothing of the females during that hour of observation. But the females apparently come to the lek, select a male—by individual characteristics or by location within the lek—and are quickly mated. They then fly off and establish a nest at some distance from the lek.

I found only two other lek species in Trinidad that spring. They were the Green Hermit and the Little Hermit, both tiny hummingbirds, lekking in small groups down near the ground level. The Green Hermits were clustered in a tight little lek, six or eight males singing squeaky little "wah, wah, wah" songs in low saplings only a foot or two above the ground. The Little Hermits, also six or eight in number, were spaced out over their lek area, perhaps no more than 10 feet in diameter and even closer to the ground. Their songs were apparently reduced to a series of rapid chirps so soft that I had to crouch down with my ear close to the ground to hear them.

The Asa Wright Nature Center had its mystery bird living up in the crowns of the tallest trees just half a mile below the headquarters building. Starting early in the morning and continuing on through much of each day this creature would shout out its endless series of explosive croaks or barks—"grok, grok, grok"—at

the rate of one every two seconds. Residents at the Center said it was a bell bird, but those monotonously repeated calls suggested no bell Jinny or I had ever heard. Furthermore no one among the center's authorities seemed able to remember ever having seen a bell bird ringing its bell. Actually the call sounded more to me like the loud croaking call of a frog, perhaps a giant tree frog of some sort.

Every day for six days Jinny and I strolled down into those high tropical forests listening for our arboreal frog, and raising our heavy binoculars to peer up into the top branches of those 100-foot trees until our necks, arms, and back ached. But we couldn't seem to spot that mystery bird.

Then one day, birding in a similar forest area a mile or so away, we heard that same familiar "grok, grok, grok." Raising our binocs to the treetops, we finally spotted a dull brown, pigeon-sized creature crouched down over a small bare branch in full view. It was indeed a bell bird, a member of the tropical cotinga family. This bird has a huge, broad, black-lined mouth surrounded by a ring of fleshy brown, string-like wattles. I couldn't help but note that the truly remarkable physical features and behaviors of this bird were associated with the remarkable voice that had called my attention to it in the first place. Could it be that the physical strangeness in these birds somehow evolved together with their strangeness in vocal performance?

Not far from the forest stand where our bell bird had finally given up its secret, a small creek trickled its way through a deep rocky cavern. This cavern sheltered a nesting colony of Oilbirds, or guacharos, members of the nightjar family. Entering through a deep, narrow canyon with high, overhanging cliffs that gradually closed in over our heads, we fumbled along with flashlights until we reached the nesting area.

The nests were scattered about on narrow ledges of mud and regurgitated fruit pulp along the walls of the cave. We counted 51 of these nests from 10 to 20 feet above the streambed. Each nest had two, yes two, adults on it, presumably the members of a mated pair. They were large gawky creatures with huge eyes and long, projecting rictal bristles. The air was filled with snarling and growling sounds, blending with an ongoing background of clicking noises, presumably echolocation sounds for navigating in darkness. The ground below was covered with regurgitated seeds of palms and other forest fruits. We watched in silence for 10 or 15 minutes, then quietly retired, worried that our presence might produce unwanted alarm in the colony.

The Emlens' next stop before leaving the West Indies was the island of Tobago, "a small, 25- by 5-mile island, lying a short distance north of Trinidad and incorporated with that island to form the nation of Trinidad and Tobago. We had made contact with a retired steamboat captain and his wife at the north end of Tobago and would soon spend a happy and profitable two weeks with them at their informal guest house."

Birds were generally abundant and diversified on Tobago. But as a moderately experienced birder, I had never seen a place where free-flying wild birds were concentrated in such densities and diversities as on Arnos Vale's Grafton Estate.

This estate consisted of a large, two story old home in the city's center. Badly run down and abandoned, the house had been literally turned over to the birds. The owner of this dwelling was a 'bird nut' whose sole function in life was apparently to feed the birds, a function currently being performed by a little old man who greeted us as we arrived in a bus with a dozen or so other curiosity seekers.

All windows and doors were thrown wide open to the breezes. The house as a result was literally swarming with birds. These included noisy chachalacas, cooing doves, singing thrushes, warbling blue tanagers, lisping bananaquits, and many others, all flying freely in and out as though they owned the place. They really did own that place as indicated by the encrusted droppings on the furniture and the grain- and dropping-splattered floors.

The big feast of the day happened each afternoon at four o'clock. Whamming away on a washboard, the little man called in even more chachalacas and other birds. This time he was literally mobbed by the screeches and the rush of wings that responded to his offerings.

From Arnos Vale and its Grafton Estate, we travelled north along the coast. Our destination was Little Tobago, a tiny (one and a half square mile) islet off Tobago's eastern end. In 1909, this site had been selected by a wealthy English aviculturist to establish a colony of the reportedly endangered Red Bird of Paradise from New Guinea. A local Tobagan, Jeremiah George, was placed in charge of these valuable birds and funded to provide food and water for them indefinitely into the future. In 1956 an ornithologist from the American Museum, Tom Gilliard, travelled to Little Tobago to photograph and check on the birds. He found only 15 but guessed there might be as many as 35. Then, in 1962, my student Jim Dinsmore flew to the island with his wife, Pat, and found only seven.

By 1979, we wondered if the report on the colony that we were about to make would be the last one. We had checked into a small rooming house in Speyside on the Tobago coast. From there we found someone to take us across the two miles to Little Tobago. Upon landing, we climbed up a steep hill to a small shack where we met, to our delight, Newton George, the great grandson of Jeremiah.

Newton was still faithfully fulfilling his multi-generational family mission as caretaker. Each day he said he came to the island to check on the birds and to fill feeding troughs and bamboo watering trays. Newton reported that there was still one male on the island and, perhaps, one female. The original forest had, not surprisingly, been badly damaged by the several hurricanes that had swept the island in the intervening decades and contributed to the near demise of the birds of paradise.

On the ridge were a couple of large cabbage palms with a dozen or more nests of the Crested Oropendolas. "Uh-uh," we muttered to ourselves, "this must be Newt's modern bird of paradise." But no, at that moment a genuine, gorgeous male bird of paradise presented itself to us in that little oropendola colony. No doubt about it. There was still, after 70 years, at least one survivor on the island! We returned the next day to double-check—just one, no more, no less! The bird we saw was not one of the original imports, of course, but a direct descendant of an unknown number of bird of paradise generations. It still possessed the same gorgeous crimson flank plumes, green throat, and golden nape as the imported birds released seven decades earlier.

The South Pacific Beckons

Keenly aware that the 1980s would probably afford their final opportunities to travel overseas, the Emlens set off to visit the South Pacific, beginning with Australia on New Year's Day, 1980. But prior to reaching Australia, they "touched down on the little island of New Caledonia, a French possession with an absolutely unique bird species, the Kagu . . . ."

The Kagu had been described as a middle-sized chunky, flightless, short-leg-

ged runner of the forests with a wonderful, nocturnal song—a low melodious, succession of musical phrases, interspersed with dramatic long pauses. Every day of that week on New Caledonia I stayed up late and rose early, several hours before daybreak, to listen for that song as I imagined it from those lyrical descriptions. I heard many interesting and strange calls during those predawn and twilight sessions, but I heard none that suggested what I had read of the Kagu's song. Then, on the last evening of our visit, our host at the inn informed us that the Kagu, having won the title of the National Bird of New Caledonia, had its song transcribed on television each morning. All we would have to do to hear that song was to set our alarm for seven o'clock the next morning and we could hear it in our own beds.

Sure enough, that last morning I slept late and as the clock struck seven, there was my Kagu. But after all my week-long preparation and anticipation, what a disappointment! I suppose it was a genuine and reasonably faithful rendition of the real thing. But without any of the atmosphere that I had experienced in those post- and pre-dawn searches, my final exposure to that artificial rendition of the song fell absolutely flat! I had already had my Kagu adventure, and it was a worthy and rich one even though I never got to hear the bird's own rendition of that beautiful song. The Kagu will continue to be a mystery bird for me, but the memory of my searches for it will always remain one of my genuine adventures in the South Pacific.

In Brisbane, Australia, the Emlens searched for the gallinaceous brush turkey, a bird renowned for its "remarkable heat-producing breeding behavior—manipulating the local environment instead of just applying [its] own internal body heat for incubating the eggs. To do this, brush turkeys pile up great mounds of decaying vegetation, or in a few cases, volcanically or solar-heated vegetation and soil, to provide and control the precise incubation temperatures required for hatching their eggs."

We met up with a species of brush turkey in a forested area near the city of Brisbane. Our bird there was a lone male, leisurely scooping out a shallow pit in the top of a huge mound of half-rotted leaves that measured approximately 15 feet in diameter and two feet in height. Undoubtedly piled up over the preceding months, this was intended for the reception of an egg to be laid by his mate when she arrived at the scene later in the day. His foot strokes for the digging operation were executed slowly and deliberately. He made several strokes with the right leg, then several with the left, much more slowly than the rate a domestic turkey would scratch in the ground. We watched for 20 minutes, astonished at his patience and the sensitivity to subtle environmental or temperature variations those males have been demonstrated to possess.

In early February 1980, the Emlens visited Phillips Island near the city of Melbourne to observe Little [or] Fairy Penguins, "a species that nests in burrows in a colony of thousands on Phillips Island .... According to the records, this colony had been attracting human visitors for over 50 years. By the time Jinny and I made our visit ... there was a concrete stadium for visitors with a seating capacity of 500."

That evening it was filled to overflowing, and the biologist in charge started the ceremony by announcing that the birds were expected to arrive on the beach down below at five minutes after nine. He also requested the viewers try not to frighten the birds when they

showed up and to leave no trash when exiting the stadium.

At seven minutes after nine—two minutes late—about twenty of the little fellows popped out of a wavelet that broke on the beach and looked around at the assembled crowds. Shaking their dense, scaly plumage, they started up the beach toward their nesting area a few hundred yards above a fenced area designed to keep the human public within bounds.

Within minutes that initial trickle of birds had increased to dozens, then hundreds. Viewers left their seats to cluster along the boundary fence for a better look at the birds that were streaming up hill. Beyond the fence were the penguins' burrows and their mates who had spent the long daylight hours incubating their eggs or brooding their chicks. The next morning the returning penguins would keep guard, and their mates would leave for a daylight session of feeding at sea.

Soon the birds were literally pouring ashore, maybe thousands of them, dashing and crowding along the boundary fence, often breaking through to tangle with the feet of the excited human observers. The children in that crowd could not completely control their squeals of excitement. But they were effectively calmed by the soft, booming voice of the supervising biologist, and, with a genuine appreciation of their own responsibilities, they behaved themselves amazingly well.

This whole episode, which lasted half an hour, was a marvelous little adventure for Jinny and me. It was an amazing performance by both the actors—the birds—and the human managers of the whole operation, an operation of successful cooperation between an avian and a human population.

From Australia, the Emlens travelled to Bali, Java (Jogjakarta), and then to Borneo, where they visited "the huge Niah Cave in central Sarawak, the tall arching vault that supported thousands of the delicate edible nests of swiftlets . . . ."

These nests are made by the birds from their own saliva, and when boiled, are said to have a mild, delicate flavor. They are greatly relished by the Chinese and, on occasion, by European and American connoisseurs, especially if the twigs, dirt, and feathers that often contaminate the raw product are carefully removed.

On this occasion, accompanied by someone from a nearby long house who knew the local dialect, we started off on a narrow board-plank forest trail headed for the famous, government-controlled cave. After several miles we came upon a locked gate, the entrance to the Batu-Niah National Park. After another mile of rough terrain, we emerged at the first wide-mouthed limestone cavern, over 100 feet high, with long hanging roots dangling from the ceiling, and with rough piles of fallen rock on the floor.

Slender wooden poles rose like inverted, elongate lianas to the cave ceiling where a delicate scaffolding of bamboo poles and rattan nets clung as though suspended by sky hooks. These were the access routes of the government-licensed native nest collectors. These collectors risked and frequently lost their lives harvesting those tiny gelatinous nests that brought as much as six hundred dollars a pound. After watching them we decided they really earned it.

Despite the terrible hazards of nest-collecting activity, thousands of nests were collected each year. Nest-collecting was restricted by law to the later months of the breeding season. Collectors selected the cleanest nests, that is those essentially free of droppings. These nests were the second and third nests built by the swiftlets, and because of their condition, they brought the highest prices.

A Life-long Ambition Fulfilled: Observing the Quetzal

In 1985, the Emlens journeyed to Costa Rica to see the Resplendent Quetzal, "that remarkable, long-tailed trogon of the Central American cloud forests."

Once in Costa Rica, we realized that a four-wheel drive vehicle could be very helpful. Remembering that I had only recently served on a committee for the Organization of Tropical Studies (OTS) in San Jose, I stuck out my neck and asked if Jinny and I could use one of their Toyota vans for the mountainous part of our travels around Costa Rica. The answer was yes, "if all of their field vehicles were not spoken for at the time we wanted it." When I called at the OTS garage several days later, only one vehicle was available, and it was in terrible condition. But the garage thought it should get us up to Monte Verde and back, so we took it. . . .

The view back across the coastal plain and out to the Pacific was gorgeous, partially offsetting the discomfort produced by the bumps, twists, small truck traffic, and other hazards of that narrow mountain road. However, we finally made it up to the summit. There we rolled out into the comfortable Pension Quetzal and settled down to catch our breaths.

Sister Mary arrived that evening with her husband, Bob Metz. After a much-needed sleep we all rose the next morning to immerse ourselves in four wonderful days of glorious birding in the rich montane forest atop Monte Verde.

The quetzals were slow to appear that first day, but we heard several of them giving their soft, guttural barks from somewhere up in the forest cover. The next day, however, we were treated to a number of excellent views of this spectacular bird, claimed to be 'the most beautiful bird in the world.'

Over the next few days we saw no less than 23 quetzals in that forest. Most of them were high up in the treetops, perched almost motionless or gulping down large fleshy fruits. Their brilliant crimson bellies suggested coals of fire up there in the trees as seen from down on the ground. Their sides and flanks were draped with long, iridescent green wing coverts. Their short, stiff tail feathers were covered with long, soft, iridescent green tail coverts extending a foot or more beyond those tail supports to wave softly in any breeze that entered the forest stillness. On top, to cap it all, was a small, bristly tuft of golden green crown feathers.

Lying down on our backs we gazed up 100 feet in the air as our birds, generally one at a time, took off to a neighboring treetop from 20 to 100 feet away. They seemed to advance cautiously as though conscious of their glorious but vulnerable plumage. Their low soft voices were appropriately suppressed to soft coos with a touch of the tremolo familiar to us in our familiar North American screech owl.

North to Fort Churchill, Manitoba

In 1986, by invitation of the International Ornithological Congress, Emlen participated in a field trip to Fort Churchill on Hudson Bay.

At 59 degrees north latitude, Churchill would not be the high arctic, of course. Nevertheless its broad expanses of taiga forests, beluga whales, polar bears, and several species of arctic gulls would at least give me a taste of what the far north and its wildlife was like.

That international gathering in Ottawa, the national capital, would, of course be great, and the sign-up for the Churchill trip included an assortment of European ornithologists whom I had

known in earlier years and would love to see again as well as many of my good friends from the U.S.

So on July 1, Canada's National Holiday, we assembled on the swimming beach at Churchill, population 1,000. There were several five- or ten-ton icebergs floating offshore as the citizens of the town gathered to celebrate the holiday, pitting two locally picked teams against each other in an intense aquatic sports competition. On signal, the young competitors, dressed in scanty bathing trunks, dashed out through the freezing surf. Their goal was to retrieve their team's ribbons 50 yards offshore and bring them back to their middle-aged captains on the beach. Not the least bit jealous, we ornithologists—well sweatered-up—watched this chilly performance and joined in the winning team's noisy celebration.

For most of the next week the serious birders were out exploring the frozen tundra on the west coast of Hudson Bay with Bonnie Chartier, our competent local guide. With Bonnie available only part of the time, I generally stuck to myself, watching the school of beluga whales, 100 or more of them, that frequented the broad, slow-moving current of the Churchill River. Each whale rose periodically to blast a loud "pooph" of spray as it rolled forward and then slid slowly back below the surface. Parasitic jaegers coursed back and forth above them, grabbing up small fry that they had disturbed and flushing flocks of Surf Scoters and eider ducks. Above them Herring Gulls, Ring-bills, Bonaparte's Gulls, and Arctic Terns circled overhead. A short distance inland I climbed up the steep, and often colorfully dappled basalt rocks to photograph clumps of dryas, cinquefoil, and pyrola or labrador tea.

One day Bonnie took us to an area a few miles to the east where we might see one or more of the rare Arctic gulls, especially the black-headed, pink-tinted Ross's Gull. Eventually we not only saw that rare species, but we watched it as it returned to its nest to settle down over its eggs.

It was a little early for polar bears, but they had already been reported close to Churchill. Bonnie always toted a rifle on her shoulder just in case. Polar bears often attacked humans when least expected, and Churchill had its roster of bear accidents, especially among young children, to report almost every year.

Birding was good, not in terms of numbers of species seen but in the abundance and diversity of northern and subarctic species. These included Tennessee Warblers, Blackpoll Warblers, Orange-crowned Warblers, White-crowned Sparrows, [and] Harris's Sparrows. Especially interesting for me, as a visitor from the south, were Savannah Sparrows, Three-toed Woodpeckers, and Brown-capped [Boreal] Chickadees.

One day when a particularly cold wind with slanting rain kept the songbirds quiet, Bonnie took us out in a huge Tundra Buggy to an area of continuous open tundra. As a result of the slightly raised elevation produced by the buggy's giant 5-foot wheels, we could look out over mile upon mile of the flat tundra landscape. The research area where Fred Cooke had been conducting his brilliant studies of Snow and Blue Geese for many years was out there somewhere towards Hudson Bay to the East. Great flocks of these noisy geese were now drifting back and forth over our heads. Here also were singles and pairs of golden plovers, Semipalmated Plovers, Smith's Longspurs, and ptarmigans. From our buggy window we spotted several broods of ptarmigan chicks as they dashed for cover behind grass tufts or other screening obstacles.

Another day we drove south for 10 or 15 miles to a sheltered area of lakes and trees. There the vegetation rather abruptly shifted to a lush, low forest of spindly spruce and tamarack only 10- to 12-feet high. This low vegetation rose from a deep lichen and sphagnum

ground cover accented with tufty white reindeer moss and scrub willows, miscellaneous herbs, and habenaria orchids. Here we added Pine Grosbeaks and Spruce Grouse to our already impressive bird list for this predominantly northern locality.

Bookend: To Argentina in 1989

Emlen ends his fine autobiography with a marvelous account of a decade-ending trip to Argentina.

I can trace my fascination for South America to my college years when I had a summer job cataloguing Brazilian bird skins for the American Museum of Natural History . . . . I learned not only about the birds but also the names of many of the collecting sites—towns with intriguing Spanish names that roused my curiosity about that faraway land to the south.

Those early memories stuck with me ever since, and I must admit that they motivated me some 60 years later to sign up for a seat on a World Wildlife tour heading for Argentina, the heart of that South American continent. There I should be able to find not only many neotropical bird species but strange mammals and marine animals. Incidentally my plans for this trip would cover the same areas that Charles Darwin explored and wrote about in his early twenties, the same age he was when he visited the Galapagos Islands and established his reputation for creative biological genius.

After a brief introduction to the pampas, the broad, fertile plain of Argentina's northeast province, we headed for the Valdes Peninsula, 500 miles to the south. There my old friend, Roger Payne from New England, had set up his South American whale research station. Roger was specializing in a study of the Southern right whale, which was locally abundant on that peninsula. Taking our whole tour group on a two-hour cruise, Roger showed us several schools of these wonderful creatures cruising by our boat with their pups at their sides.

The very next morning we visited Roger's whale camp where I had good conversation sessions with Roger and several of his research crew. On that peninsula we also watched several groups of wild guanacos, one of South America's camel relatives, and several Patagonian hares, suggestive of California jack rabbits but with short ears and big square heads. Out beyond the whale camp on the open sea were at least three large whales and several large sea birds including two Black-browed Albatrosses, two Giant Petrels, and about 30 Sooty Shearwaters. The whales were far out at sea, but we watched several of them displaying in the distance with their spectacular breaching and tail sailing antics.

At noon we drove south to Punto Delgado where we spent the afternoon with a colony of about 40 elephant seals, huge, ungainly creatures with large floppy snouts. There, besides several spirited male vs. male chases, we watched a mother elephant seal in the act of giving birth. In this rarely viewed performance, the mother bellowed and writhed in apparent pain until, after an hour, the pup was birthed and the afterbirth was discharged. It was not until this discharge appeared that the mother finally relaxed and settled down to nurse her pup.

From Punto Delgado we moved on through the Welsh town of Trelew with its sheep ranches and its groves of tamarisk, pines, cedars, and eucalyptus. We arrived at the gigantic nesting colony of Magellanic Penguins at Punto Tombo. This colony was reported to contain over 500,000 penguins plus additional thousands of Kelp Gulls, Giant Petrels, steamer ducks, and Imperial Cormorants.

The history of this colony as related to us by a graduate student, Carla Mackie, was fascinating. Apparently the colony

never existed until the turn of the twentieth century, nearly a hundred years earlier. In shallow burrows under dwarf shrubs, members of each penguin pair shared the responsibility of incubation and brooding the two eggs lying side by side in the burrow. Every year research crews banded some 6,000 adults and 4,000 chicks at the 3,000 penguin burrows, collecting data on breeding success, diet, behavioral interactions, and migration. Just as penguins in the Antarctic returned each year to their own rookeries, these Argentinian birds bred from September to November then left the site to return again the following September . . . .

For the next few days we drove north along the eastern flank of the Andes for some 1,200 miles toward the Bolivian border. I had been worried that my rather feeble heart might be strained by the altitude. Before I left Madison, however, I had cleared this possibility with my son, Dr. Woody. He proposed that I could and should risk it if I felt no ill effects at Salta, a town at 10,000 feet where we would spend the night before our final ascent.

Upon getting a green light at Salta, we decided to head for the peak as planned. Our bus wound its way up through steep, rolling short grass mountain meadows. We stopped en route to photograph wildlife and primitive mountain villages with houses built of mixed adobe and field stone, obviously garnered in the stony ground nearby.

Finally we reached our destination, the shores of Laguna Pozuelos, which was 14,000 feet above sea level. Our host, the bus company, brought out and threw down a huge canvas tarp on the ground on which they spread a rich selection of sandwiches and fruits. But first, of course, every member of our group was training his or her scope on the distant scene to the west. There long lines of flamingos were wading back and forth along the distant horizon. Their forms were distorted by distant heat waves in spite of the cool temperatures of these high plateaus. We could clearly pick out at least two of the three species known to occur on these high-altitude lakes. These were the Chilean Flamingo (which has red knees) and the Andean Flamingo (which has yellow legs). Rather strangely we saw none of the Puna Flamingos (which have yellow bills).

While flamingos dominated in terms of numbers, we also saw thousands of ducks, geese, and shorebirds. This was, of course, the wintering grounds for many of these species familiar to us Norte Americanos back home. Big black and white Muscovy Ducks were prominent targets for our scopes as we swung them back and forth across the teeming flats.

It was a spectacular sight and one that was reminiscent of the many impressive scenes I had witnessed in other places and other years. By the time I reached this age, in 1989, I could look back over a rich and rewarding life in which I had visited all of the world's six continents and a representative sample of its many islands. How lucky can a guy get?

Professor Emlen continued to live a full life for several more years. His passing away on 8 November 1997, after a lengthy illness, was not unexpected, but left many friends and colleagues deeply saddened, for it marked the end of a lifetime of distinguished service.

Graduate Student Testimonials

John Emlen was an inspired and dedicated naturalist whose life and work influenced many, and who profoundly touched those most privileged to work with him—his graduate students in the Zoology Department at the University of Wisconsin in Madi-

Figure 14. John and Jinny Emlen at home in their Madison, Wisconsin, living room, 1990. Photo by Stephen Emlen.

son. Over the course of his academic career, Emlen helped guide 62 students toward a masters or doctoral degree, and the roster of their names reads like a veritable *Who's Who* in the fields of ecology, animal behavior, and conservation biology over the past several decades. Recollections of their advisor, or "Doc" as most knew him, are presented below from 18 former Emlen students, as well as one former undergraduate and one research colleague. Emlen's lasting impact on his students' personal, as well as professional, lives is apparent in nearly every one of their accounts. His legacy continues to grow, as one writer notes, as Emlen's students beget him scores of academic grandchildren and great-grandchildren through their own teaching careers.

Concerning Emlen's scientific career, Gordon Orians, Professor Emeritus of Zoology at the University of Washington and a former undergraduate student at UW-Madison, delivered the following remarks at the 20th International Ethological Conference held in Madison in August 1987.

> As a researcher, Doc had a truly eclectic mind. He is not identified as the author of any major theories or conceptual advances in biology. Rather, he had the gift of sensing what was important in current controversies and knowing how to gather data to distinguish between competing hypotheses . . . . [He] also recognized the importance of experimentation and he performed some of the pioneering experiments in ethology and ecology . . . . Yet Doc was always sensitive to the limitations of experiments and was

alert to the possibility that experimental procedures themselves introduced artifacts that might mislead unwary investigators . . . . Moreover, experiments never became a substitute for good natural history which provided both a guide to which experiments were most important to conduct and insights into the interpretation of results . . . . Throughout his career, Doc understood clearly that field and laboratory data were no better than the methods employed to generate them. As a result, he had a sustained interest in research methods. He made important contributions to methods of censusing animal populations and methods of estimating the limits of accuracy of field estimates of population densities . . . . Few people have touched so many different areas of biology and left their imaginative imprint on them.

John Wiens, now University Distinguished Professor of Biology at Colorado State University in Fort Collins, arrived in Madison in the summer of 1961 to study with Emlen.

[I was] an enthusiastic but blissfully naive young student with an interest in nature but with no ideas what to do with it. Over the next few years, John Emlen gently but persistently channeled and focused that interest, but he did so without blunting the enthusiasm one bit. In fact, through his own unbridled enthusiasm about nature and the excitement of discovering how it works, he instilled a spirit of investigation that has sustained me for decades. He taught me, by his own example, how to take joy in doing research and how to think about nature in ways that are unfettered by accepted dogmas or conventional wisdom about how things "ought to be."

One of the terms that comes most readily to mind when I think back to my time with Johnny's group in the early 1960s is diversity. He had assembled a large group of students with diverse interests and approaches to ecology and behavior, and rather than attempting to consolidate these interests, he encouraged the diversity. I think that, in many ways, this reflected his own broad array of interests, which spanned a variety of animal taxa and disciplines. John Emlen was an interdisciplinary scientist well before the term became fashionable. All of us thrived on this diversity, and we have carried it with us through our careers.

If there was any central theme to Johnny's own work, and to the studies of my cohort of students, it was the importance and power of observation. Ecology and ethology were becoming increasingly 'scientific' and relying more and more on experiments, and already there was developing an attitude that observations were 'just descriptive' and of little scientific value. John did experiments, to be sure, often experiments that were elegant in their simplicity and cleverness, but the foundation was always observation of nature. John had a naturalist's eye for important details, and while few of us mastered that skill, we did learn how to observe nature in a systematic way. He also taught us the importance of observing nature free of the blinders imposed by what prevailing theory said we ought to see. These teachings were rarely explicit, they were simply the way he did things, and how, in his subtle ways, he encouraged us to think and observe. All of us, his students and colleagues (for we were always both), carry with us pieces of this legacy. Many of us have gone on to instill in our own students some of these values: the importance of observing nature, the value of diversity, the excitement and joy of research, and (we hope) how to be a professional while retaining humanity and humility. But no one did it better than Johnny.

One interview was all that was necessary for Wesley E. Lanyon, Lamont Curator of Birds Emeritus at the American Museum of Natural History in

New York, to choose Emlen as his adviser, despite more lucrative offers from other schools.

When I visited several graduate school programs during my spring break at Cornell in 1950, Wisconsin was the only university that was unable to offer me much needed financial support for the coming fall. Yet I chose Wisconsin (over the likes of Illinois and Ohio State) as a result of my interview with John Emlen. The warmth of his personality and the willingness he showed for having me join his program was the pivotal factor in my choice of Wisconsin for launching my career in ornithology. True to his commitments, John found financial support for me for the spring semester and thereafter throughout the five years I spent in Madison.

It was "Doc" . . . who suggested I tackle the "meadowlark project" for my dissertation—a project he had "placed on the back burner" . . . waiting for "just the right grad student to come along." Of course, that may have been a tactful way of saying he had not been able to convince any of his previous students to tackle such a high risk dissertation topic. Nevertheless, the years that I spent in Madison were the cornerstone of my research career. I shall always be greatly indebted to him for the opportunity to learn and mature under his guidance. He was a valuable source of encouragement, advice, and inspiration, and never too busy (even while serving as department chairman) to open his door to a graduate student in need . . . . I was particularly moved by his recommendation, in a letter received soon after my joining the staff of the American Museum of Natural History in New York, that perhaps I should call him "John," now that I had entered the ranks of professional ornithologists . . . .

In some ways, the most moving event in my mentor-student relationship with John came many years later, with the passing of the gavel when I succeeded him in 1976 as President of the American Ornithologists' Union. Heart surgery and subsequent convalescence had delayed his ascendancy to that prestigious office, with which he otherwise would have been honored years earlier. I will be forever grateful for all that John Emlen did for me.

George B. Schaller, Director of Science for the Wildlife Conservation Society, remembers the pioneering field research on mountain gorilla behavior that he and Emlen initiated.

"Doc and I went down the trail to check on the gorilla tracks I had seen last night. Only 100 yards off the trail we came on the group feeding on a steep slope. We quietly stepped behind a tree and watched. There were nine animals. Every so often a dark hairy arm reached above the vegetation and pulled off a leaf . . . . Some animals worked in our direction, a female with young and [a] big silverback [male]. I quietly climbed eight feet into the tree above me. The female with young came and sat on the trail in full sunlight only 40 feet away . . . . The female happened to look in my direction, a soft look in her eyes. Suddenly she focused on me, her eyes hardened, and she quietly grabbed her young around the waist and ran into the brush, letting out a terrific scream as she did so. The male roared and the group assembled and watched us from 80 feet. After a while they spread out to feed . . . . We watched for three hours."

This laconic excerpt from my journal, dated March 15, 1959, describes one of the first encounters with mountain gorillas that John Emlen and I had in the Congo. My quote neither conveys our excitement, even apprehension, at being so close to these mysterious and reputedly belligerent apes nor our delight in perceiving that they were almost as curious about us as we were about them. A study

would be possible. Without knowing it at the time, Doc had inaugurated today's long-term studies of the great apes.

I was indeed fortunate that Doc accepted me as a graduate student .... With his wide-ranging interests from laboratory to field studies of birds and mammals, Doc gave his students the freedom to choose a thesis subject, and he then enthusiastically participated in the research—guiding, prodding, teaching by quiet example. We spent months together in the field on a survey of gorilla distribution, and I came to admire and respect him immensely, not only for his knowledge, curiosity, and scientific rigor but also for his generous and kind nature that so calmly deflected my occasional impatience and impulsiveness. He, more than anyone else, taught me the importance of natural history and conservation, and he initiated me into a life-long task of studying and helping protect large mammals and their habitats in remote corners of the world. For that he has always had my deepest gratitude, and my months with him will remain among my fondest memories.

Patricia D. Moehlman, Research Associate with the Tanzania Wildlife Research Institute, first met the Emlens in the spring of 1967. "I had a dream of doing field research in East Africa and Doc helped with advice and letters," she says. "Soon I left for Tanzania to work as a research assistant for Jane Goodall."

When I came back to the United States, I traveled to Madison . . . to interview with Doc in hopes of becoming one of his Ph.D. students. We discussed what I was interested in, I was accepted, and it was the start of some glorious years in graduate school. In the early 1970s, it was a rare professor that was willing to advise a female Ph.D. student who wanted to do large mammal field research. With Doc, it was never even queried. From the beginning he guided, advised, and supported my research and aspiration to be a good behavioral ecologist.

The years spent with Doc and my fellow students of fourth floor Birge Hall were full of intellectual challenges and excitement, and practical problem solving for research in the field. But these years were also ones of concern and commitment to social, political, and economic issues. Both Doc and Jinny were actively engaged in addressing such issues as human rights and the war in Vietnam, and their quiet commitment was a guiding light for many of us.

A Community of Learning

By most accounts, Emlen created a community for learning in which the usual boundaries between professor and students were blurred. Many speak of him as being as much a friend or coworker to them as an advisor. While Emlen's firm command of the disciplines of ecology and ethology provided them valuable technical assistance, his considerable thoughtfulness and calm manner set his students at ease. David H. Thompson, former Education Director at the International Crane Foundation and now a professional photographer in Madison, describes what it was like to be an Emlen student during the early 1970s.

John Emlen had a large number of graduate students, probably more than any other professor in the Zoology Department. Whereas the usual practice was to have just a few students, Emlen had 10–20 masters and Ph.D. students at a time. I think that some of the other professors did not approve of this approach, since obviously Emlen could not collaborate closely with so many students at a time. But he did look after us. Rather than creating a close professional col-

laboration with each student, he helped to create a research group that provided a collegial and supportive atmosphere for all students.

Two key elements of the research group were the Wednesday noon informal presentations and the Tuesday evening research seminars. At the Wednesday noon presentation, students usually talked about their field work during the last summer .... These presentations nearly always involved slides, and were warm and informal travelogues about the trials and tribulations of field work and the wonderful scenery. For example, we saw slides of trips to the Galapagos by Craig McFarland (studying the tortoise) or the Peruvian coastal deserts by Jerry McGahan (studying the Andean Condor) .... Sometimes ... visiting researchers from other universities would visit and informally present their research. I remember especially one primatologist who imitated the gestures and hoots of chimpanzees ....

At the Tuesday evening research seminars, each student had a chance to present his plans for research, or present results from the preceding summer season. The entire research group would then provide friendly feedback—critiques and suggestions about methods or interpretations. Sometimes Dr. Joe Hickey also participated. These evenings might be preceded by dinner at Doc's house for 2–4 students, at a table that felt like home. But whether or not dinner was served, there would be a friendly banter back and forth as all the students assembled. We would talk about the objets d'art that Doc had picked up in Africa. Some years later, he would proudly show off his collection of beer cans obtained during his world travels, displayed on shelves in the back hall. Sometimes Doc would start the session with a game.

These evening research seminars were extremely helpful. If you received encouraging feedback, you gained confidence, knowing you were on the right track. One of my clearest memories is of Doc sitting in his chair, making comments about the research at hand. His comments were so clear, insightful, and to the point, and delivered with such calm authority. He had a thorough command of the ornithological and behavioral literature. As journals like *The Auk* or *Animal Behavior* arrived, he checked the most relevant articles and read them, then called them to the attention of students to whom the articles were relevant.

"John Emlen was more than a major professor; he was a friend and colleague," comments Richard R. Bond, President Emeritus and Professor of Zoology Emeritus at the University of Northern Colorado in Greeley, who says his career "diverged from biology into university administration. I never felt the teacher/student barrier, for he was an intellectual participant in my research and developed a warm relationship with me .... John was not an exciting lecturer, although his strong interest and ... expertise in both ornithology and mammalogy were overwhelming in class. Where he shone most was in the field, where his knowledge and excitement were contagious."

Adds David Thompson: "Emlen was not comfortable as a teacher in a lecture format. During both of the courses I took from him, he conducted the lecture in the laboratory, and sat at one of the benches while he gave the lecture. During lecture he behaved like a shy person, but in no other context did he ever seem shy to me .... Nevertheless ... I rate him highly as a teacher at the graduate level."

Madison native Stephen G. Martin was a boyhood friend of the Emlens' son Steve, and attended the University of Wisconsin as both an undergraduate

and a graduate student. He is now president of S. G. Martin and Associates, an environmental consulting firm in Wellington, Colorado.

> Doc was continually evaluating opportunities for his graduate students and the more enthusiastic and capable of his undergraduate advisees. He always seemed to be very well networked into possible research assistantship and related positions that might make sense to his students, no matter where in the world the opportunities arose. When he saw a "fit," he encouraged the appropriate person to go after the situation . . . . The resulting experiences complemented and enhanced a student's basic program of studies and research, and were often far superior to learning in a classroom or laboratory setting . . . . The training I received from Doc in Madison (and the opportunities that came to me while a student because of his mentorship) prepared me very well for my non-academic career. Much of what we learned from this remarkable man had universal applicability to professionals.

In the Field With "Doc"

As capable as he was in a campus setting, Emlen's abilities as a field worker were "truly legendary," says David Thompson.

> When outdoors, he was constantly observing and writing notes in his Dietzgen waterproof engineering field book. When a field book was finished, he indexed it. (I think he even kept notes of conversations and daily happenings.) He established techniques for surveying the densities of meadowland birds along highway transects, and whenever he traveled somewhere, he would stop and make observations. While someone else might wonder whether there were more Red-headed Woodpeckers this year, Emlen was the type of person who would have recorded hard numbers in his field books on the numbers of birds, the weather, and the quality of their habitat.
>
> . . . Emlen showed an amazing dexterity when recording the data in his field book. He could handle the binoculars, keep track of a stopwatch, make complicated tally marks on a data sheet, and keep written notes, all at the same time. It was the intellectual equivalent of a juggler's performance.

Emlen's knack for designing research and experimental apparatus, often out of simple materials, served him and his students well in many difficult field situations. Here Thompson describes the genesis of what he calls a couple of Emlen's "Rube Goldberg devices":

> In Antarctica, we released penguins during bird navigation studies, observing and recording the penguin's departure directions. But we needed a more convenient method to estimate their directional tendencies, something quicker and more convenient than releasing, observing, then recapturing them. It had to be an observational technique that would work at a distance, so our presence wouldn't influence the birds' directional preference. Emlen worked on a number of ingenious schemes, such as placing the birds in a pen, with a polished stainless steel bowl in the middle of the pen acting as a spherical mirror to show what part of the pen the bird was in. Then he placed a second, flat mirror above the bowl, tilted at a 45 degree angle, so he could use binoculars to look down on the bowl from above. The penguin's position in the pen was revealed as a black dot on one sector or another of the shiny bowl. When that method didn't pan out, he then thought of creating a platform of snow with a "cliff edge" around it. To release the penguin by remote control, he placed it in a pit in the snow (on top of the platform),

with a wooden lid on top of the pit. The penguin was liberated by pulling a lid off the pit with a string. The penguin then popped up like a missile. Next the penguin revealed its directional preference while wandering around the edge of the platform, looking for a way to get down.

Thompson notes that Emlen remained a dynamo in the field even later in life, as on a field excursion to do bird work along the Upper Mississippi River.

I had a good opportunity to see Emlen's energy and enthusiasm for field work . . . [after he was] already retired, and in his sixties or early seventies. A heart attack and bypass operation were some years behind him. But when we got up at dawn to do transects, Doc was usually the first person up! He seemed to flow out of the tent, quickly brush his teeth and gobble down some cereal, and then he was off to make his daily observations, all within about ten minutes. Meanwhile, the other field workers, 40 years younger, were still emerging, rubbing their eyes and scratching their scalps.

Frequent setbacks and unforeseeable glitches are a given for field biologists, but Emlen weathered these difficulties with equanimity. Remembers Helmut C. Mueller, Emeritus Professor of Biology at the University of North Carolina in Chapel Hill:

In 1957, Doc accompanied me on my first attempt at studying the homing [behavior] of bats, a project which became the subject of my doctoral dissertation. The department vehicle was not available, and we took his family's only car to an abandoned lead mine about 80 miles from Madison. We carried our sleeping bags and other gear down to the mine entrance, captured about 50 bats in the mine, and returned to the car after dark. We were releasing bats every half mile along a country road about 15 miles from the mine, and Doc was accelerating rapidly between stops. Suddenly, there was a loud noise, and the car skidded to a stop. I got out and looked under the car and saw oil pouring out of a gash in the crankcase. We were obviously there until daylight.

Doc expressed no dismay over the car, which was obviously going to cost hundreds of dollars to repair. It was a cold and uncomfortable night. When I awoke, Doc was not in the car. I found him sitting by the side of the road, where he had accumulated several pages of notes on Cliff Swallows, which were nesting in a nearby culvert. His cheerfulness and industriousness after such a miserable night amazed me. He handed me half a banana and half a candy bar and was off to find a farm to call for a wrecker, which took the car to a garage and us to the mine. We then walked about four miles to a highway and hitchhiked back to Madison . . . . The expedition was typical. In all the years I knew Doc, he was unfailingly cheerful, optimistic, and constantly involved in something, usually science . . . .

Thomas C. Grubb Jr., of the Department of Evolution, Ecology, and Organismal Biology at Ohio State University in Columbus, relates the following story:

Doc agreed to take me on [as a graduate student] in the autumn of 1967 . . . . My years at UW coincided with John's heart troubles, which eventually were ameliorated through bypass surgery . . . . In the summer of 1970, John came to visit me at the Kent Island, New Brunswick, field site where I was in the midst of my doctoral research on olfactory navigation in Leach's Storm-Petrels . . . . My outstanding memory of that episode was the elegance with which he dealt with adversity. In retrospect, I suppose that his

difficulties on the Kent Island trip were small potatoes compared with his experiences on some of his third world expeditions, but it must have been somewhat disconcerting to have the airline lose absolutely all of his luggage. He never did retrieve the luggage during his trip; it was waiting for him upon his return to Madison.

Anyway, John carried on as if nothing had happened, buying some fisherman's clothes and tennis shoes on Grand Manan, the nearby large island. He spent several nights sitting out in complete and utter darkness under a spruce-fir canopy with my infra-red field scope in hopes of sighting a petrel on its way back to its breeding burrow. I think he was able to see one bird over the total of perhaps 18 hours. I got to know John well on that occasion and have wonderful memories of the stories of his experiences with which he enthralled those around the long dinner table in the "dorm" on the island.

Emlen the Editor

Emlen's voluminous and detailed comments on his students' theses and manuscripts provided a valuable education in scientific writing. Says David Thompson:

> . . . [U]nlike many professors who procrastinated in reading theses, Emlen was very prompt in responding to memos or providing criticism of anything you wrote. And his critiques were extremely thorough—the [manuscript] would always come back covered quite densely with pencil marks and comments. Sometimes there would be one or more additional sheets packed with single-spaced, penciled writing with more general criticisms or ideas. Since Emlen was always an easy-going and friendly person, most of his students, including myself, were shocked by the amount and intensity of criticism they received on their theses. It was a trial by fire. But in the end, we realized that this intensity was just making our product all the better. Once, during my thesis revision process, Emlen told me that his major professor had told him that there was only one best way to write any sentence. Emlen went on to say cryptically that he didn't know whether this assertion was true or not—but the implication was that there were probably only two or three best ways to write the sentence, and that my version of the sentence wasn't one of them.

Stephen Martin relates that "each iteration of my thesis would come back covered with his comments and suggested editorial changes. When the third draft, a version I was quite proud of, was returned to me, a note from Doc apologized for all the markups, indicating 'I simply can't help it . . . I pick up my editing pen, and look what happens!' "

Biologist, author, and poet, Robert Nero, formerly with Manitoba Natural Resources in Winnipeg, recalls the following:

> Doc's standards for writing a technical paper were made clear to me early in our relationship when I sought his approval for an article I'd prepared for *The Passenger Pigeon*. He had me rewrite that piece three times, pointing out that in publishing something, one should keep in mind that an article in a journal was a permanent record. He emphasized that one should strive for utmost clarity, on the basis that it had to be understandable by readers worldwide. My manuscript finally satisfied his scrutiny, so I excitedly submitted it. In time it appeared in print—it was my first ornithological publication (Cedar Waxwing caught dozing, 1948, *Passenger Pigeon* 10:32). Not much more than a paragraph in length, it gave me immense satisfaction. More importantly,

I have remembered and put to use these past 50 years Doc's lesson in scholarly writing.

And from Richard Bond:

Who can forget Doc's blue pencil? He did more to shape my writing than any English teacher I ever had. A fierce opponent of unnecessary words, he taught me the power of the simple statement, especially in scientific writing. It stood me in good stead when, in my last years of teaching before retirement, I was teaching scientific writing myself.

The Lighter Side of the Emlens

Many former students remember with gratitude how the Emlens opened their home to them for frequent informal gatherings, and the fun that resulted from the family's pet bird, Doc's passion for his offbeat hobby of collecting beer cans, and even his occasional absentmindedness.

"Not all of my time in Madison was spent in the serious pursuit of my research," notes Wesley Lanyon. "My wife and I were guests of John and Jinny on many happy occasions .... We had the good fortune of knowing their pet Mynah—an incredibly well-educated bird that could imitate a flushing toilet, and announce "There's a storm warning—don't forget your rubbers!"""

Recalls Jack Kaspar, Professor Emeritus of Zoology at the University of Wisconsin, Oshkosh:

It was [Emlen's] custom to invite graduate students to his home, sometimes during the visits of noted investigators from Europe as well as North America. It was an awesome experience to meet celebrated behaviorists such as Konrad Lorenz, Nikko Tinbergen, Karl von Frisch, and many others under these informal circumstances in the Emlen home, with the always gracious Jinny Emlen, and one or more of the three Emlen sons. Also present was a vocal Mynah in the background, which occasionally produced particularly well-timed flushing sounds, coincident with a naive grad student's question, or a pontification by the visiting authority. And who could forget the unusual hors d'oeuvres such as chocolate-coated ants and grasshopper parts, direct from Africa.

Emlen's large collection of beer cans from around the globe was the source of much amusement. Says David Thompson, "Emlen always had a charming personality, almost boyishly engaging . . . and didn't have an ounce of pomposity—he would show off his beer can collection like a proud father, possibly even relishing in the knowledge that it was offbeat, humorous, and even a little strange for a professor ...."

Gordon Orians recalls an incident with Emlen in the field:

While he was down in the dust engrossed in the activities of a small, iridescent predatory beetle, he suddenly let out a whoop of delight, shifted to a nearby trash heap, and rummaged in it. Shortly he arose with a wide grin, holding what he proudly announced was a "fossil Schlitz," to be added to his extensive beer can collection. There is a persistent rumor, doubtless false, that Doc sent his students to so many interesting corners of the world primarily to facilitate their sending unusual beer cans back to him.

According to David Thompson, Emlen was sometimes "the classic 'forgetful professor.' He had little lapses of memory about details of everyday things at the university. But obviously

his mind was razor-sharp, as we could see by his comments at research seminars. The forgetfulness didn't prevent good leadership and administration."

Theodore Sargent, now Professor of Biology at the University of Massachusetts at Amherst, may well owe his graduate career to one of Emlen's lapses of attention to university details. Relates Sargent:

> As a newly arrived graduate student in Madison, with a burning desire to work for Dr. Emlen, I was advised that Dr. Emlen had "way too many graduate students, and wouldn't be taking on any more." But I made an appointment anyway, and finally got into Doc's office. His first question was simply, "Who are you?" I responded that I "was one of his graduate students." To this day I am not entirely sure of my reasons for being a little loose with the truth, but the result was perfect. Doc said, "You are! Well, I must put your name in my book!" And so I became an "Emlen student"—a privilege that I have cherished all the days of my life. [He was] a kind man, a gentle man—and sometimes an absent-minded man!

Lessons For Life

A recurring theme in the comments of Emlen's students is that the lessons they learned simply by observing how "Doc" lived his life and interacted with people were ultimately as important—or more important—than anything they learned from him in an academic setting.

As Thomas Grubb explains:

> To this day, I find myself modeling much of my behavior toward my life and students after that of John toward his. I follow the same order of priorities as I think he did: 1) family, 2) well-being of one's graduate students, 3) own research, 4) everything else. He was infinitely patient, made no comments about [his students'] various dumb attacks, was gentle, civilized, and considerate. To a truly unusual extent, his legacy lives on, as today we see the generation of his academic great-great-grandchildren taking their places in the world.

Patricia DeCoursey, Professor of Biological Sciences at the University of South Carolina in Columbia, feels that Emlen's life exemplifies "the highest degree of happiness to which we can aspire: self-fulfillment." The following is from a tribute she presented at Emlen's memorial service at the Quaker Meeting House in Madison in November 1997.

> John Emlen was a brilliant scholar and a gentle, quiet, tolerant human being who delighted in animals and in warm interpersonal relationships with people from all walks of life. These were the qualities that first attracted my husband and me, along with 60 other graduate students, to join his laboratory over the years and complete our graduate degrees under his mentorship. All 62 of us realized that deeply profound, unique features of character and personality underlay the deceptively simple exterior. Most of us, however, didn't dissect the details of the wellspring of acceptance and encouragement by the entire Emlen family. Nor did we analyze the intellectual growth in us that these influences fostered. We thankfully accepted the rare gift of his mentorship, continuing friendship, and scientific collegiality as one of the rarest and most highly prized treasures of our lifetimes.
>
> . . . I have attempted to be analytical about John's uniqueness. What were the specific qualities that made him a world-renowned scientist and teacher, esteemed and honored around the world, loved by endless friends and colleagues across decades of time and oceans of

space ? . . . It seemed I might understand John's greatness better if I looked for flesh-and-blood, historic, self-fulfilled figures with similarities in lifestyle to John's. The odyssey took me over three millennia of human existence and around the globe. I came back repeatedly to Giovanni de Bernardone, born in Italy in 1182, and far better known as Francis of Assisi, or more simply as St. Francis. Many obvious similarities abound: the love of birds and other animals, the ability as a teacher, the simple life style, the magnetic attraction of followers by a basically solitude-loving naturalist, the respect and generalized love for every member of humankind. It is in the comparison of the more profound features of personality of both their lives that the cameo of John's gifts becomes crystal clear. A prominent writer's comment about Francis applies equally well to John: "This humble man has touched countless men and women. In him they found a neighbor, a friend, an inspiration which has transcended the accidents of space, time, and even ideological outlook, a man who has cast a peaceful, creative spell on the world around him."

The final testimonial comes from David W. Sample, grassland community ecologist with the Wisconsin Department of Natural Resources. Sample was not one of Emlen's graduate students, and befriended him only during the latter years of Doc's life. His comments paint a tender portrait of Emlen as an untiring and inveterate observer of the natural world.

I first met John Emlen relatively late in his life, when he was about 77 years old. In 1986, he trained me to run a series of annual surveys he started in 1964—but had given up due to hearing loss—tracking Dickcissels and other grassland birds on five routes in rural Dane County, Wisconsin. We continued to run at least one of those routes together for several years. We also got together occasionally for other birding trips, field work and visits.

I typically called John the night before a trip to firm up plans. He would invariably react enthusiastically—he seemed up for anything, anytime—and always shouted out loudly to Jinny, asking her if he had any other commitments that particular day (far more than most all couples I have ever met, John and Jinny effectively functioned as one person).

On a typical survey morning, I would pull into John's driveway before dawn. One light would be glowing in the kitchen, but often John would already be outside in the near-darkness, pulling weeds in his vegetable garden. He would wave, get in the car cheerfully (although with some physical difficulty, especially in later years), always dressed in the same simple field clothes: basic moccasin-toed leather hiking boots, old khaki pants, work shirt, and jacket. His field equipment spoke of an era of field ornithology past—Zeiss binoculars that had to be at least 40 years old, a beat-up masonite clipboard with a rubber band in place to keep the field sheets from blowing in the wind, a yellow wooden No. 2 pencil.

He was not overly talkative on these trips; his "small talk" was exactly that: small. This was especially true when it came to talking about himself. He usually appeared most excited about getting out of town, out to the fields and pastures he had visited annually for over three decades. John never bragged or boasted, which would have been easy given his illustrious career in ornithology and animal behavior. In this sense he was a humble and very approachable person. Occasionally we would talk about his youth in the Philadelphia area (we had a connection here, because my father and he had both grown up and attended the same small Quaker school). In particular, I remember a story about a terrible car crash in the 1920s or '30s that killed a number (six, I think) of his cousins, and stories about his developing interest

in birds and nature as a child; these latter stories vividly conveyed the strong support and encouragement he received from his parents. Sometimes he would talk about his field adventures to far-away places or his miraculous recovery from heart surgery over 20 years ago.

John had a positive outlook on life that was completely genuine, infectious, and inspiring. As such, he did not want to dwell on the difficult parts—the aches and pains—of aging; although in the last several years he did express some frustration with his increasing memory loss. He would much rather focus his energy outside of himself, talking about other people, topics of interest in ornithology, and the good things happening around him. He would always ask me about my work and family, and offered helpful encouragement during the time when I was looking for a job. He particularly liked to tell stories about former students. I was continually impressed by the number of visits, calls, and letters he received from long-ago graduate students. It was obvious that he had made an indelible impression on these people and that he cared about them enough to have forged strong and lasting relationships with them. Not only had he been a mentor to them, he was a friend. He was both of these to me as well.

When out in the field with John, I was amazed and truly inspired from the start by his energy, and by his excitement and curiosity over little things in the natural world. In the late 1980s he would not hesitate to hike vigorously through fields with me that most 80-year-olds would have avoided altogether. He loved to talk about his unique field observations, such as his way to characterize the song of the Vesper Sparrow ("like the Song Sparrow, but in a minor key") or the difference between the silhouettes of Dickcissels and other small passerines perched on utility wires along the road we were driving. He was a wealth of information on the history of land use changes on the farmland he had traversed for so many years; farmland that in many cases he had seen converted into suburban developments. He lamented the loss of open country birds he had witnessed along with those changes, but was fascinated by the increase in birds such as Chipping Sparrows, grackles, and cardinals that liked lawns and horticultural plantings. He was often trying new hearing aids or fiddling with the ones he had. He didn't seem despondent over his hearing loss, which seemed unusual for someone so keyed into and appreciative of bird song. He turned his disability into a challenge and source of research interest. In fact, when I first met him, he was still working on his last manuscript on hearing loss and bird surveying! He always listened intently when we were surveying, even though he could only hear a fraction of the birds I heard. His childlike joy over hearing a distant Savannah Sparrow or meadowlark singing with a new hearing aid arrangement was palpable.

On occasion I would visit John at home and he would invite me into his office. His home, an old rambling place near the University, was filled with art and other objects collected during his times spent in far away places, Africa in particular. A stair elevator served as a reminder of his long-term heart troubles. A small room off the kitchen was lined with shelves almost floor to ceiling that contained nothing but beer cans he had collected from all over the world, something he took great delight in. I loved to sit with him in his office. Walking into it was like stepping across a threshold into the past: it was simple, functional, and workmanlike, with a slightly musty smell. Everything in it was old. At one end, there was a desk underneath a window with a brown goose neck lamp similar to those used on lab tables long ago, shelves lined with old books along another wall, and various piles of papers. Another wooden desk sat against the opposite wall. Several photos from various of his

(or his students') field sites around the world were hung on the walls. I once inquired about an old shoebox on one shelf that was crammed to overflowing with note cards. He explained that, for a great number of years, he had walked his neighborhood each Sunday, recording on an index card the number of gray and fox squirrels he observed. All of these cards, which he said documented the decline in the local fox squirrel population, were in that box. He had never had time to summarize the information.

On occasion our family would stop by the Emlen house for brief visits. John and Jinny were always delighted to see us and our two children. Jinny would drag some old-fashioned toys out of a closet and (much to their delight) offer the kids a ride on the stair elevator. We enjoyed these visits immensely. The way John and Jinny cooperatively told stories seemed to be a skill that had been honed to a fine art over their many decades together. Even their small disagreements had a loving, respectful tone to them.

John continued to come out on surveys, despite some pain and difficulty in walking, until 1994. In the last couple of years of his life, he was no longer able to take his regular walks at Picnic Point or the UW Arboretum. Even walks to the corner of his block became a challenge. He still came out occasionally to bird watch from a car until the fall of 1996, when we drove to Goose Pond [in southern Columbia County] to view Tundra Swans and other waterfowl. Clearly unhappy about being increasingly housebound, he still relished the idea of getting out and seeing things.

John Emlen was an amazing person. I feel very lucky to have known him.

Finally, it will sadden many to learn that yet another chapter in the life of the Emlen family has closed with the death of Virginia "Jinny" Merritt Emlen at her home in Madison, Wisconsin, on 10 January 1999 at the age of 88. According to an obituary prepared by her children, Jinny met her future husband while a political science student at Cornell University in the early 1930s. A young J. T. Emlen Jr., they note, "wooed her with early morning bird walks, awakening her discretely and quietly (without disturbing her parents) by tugging on a string tied at one end around her big toe and carefully draped out the window." The two were married 25 June 1934, "and remained devoted to each other for 63 years, until Johnny's death in November 1997."

Acknowledgments

Over 20 former Emlen students submitted remembrances of their former advisor, but space limitations prevented including them all. Profound thanks go to all who contributed; apologies, as well, are due to those whose submissions were not included: James J. Dinsmore, Bob Galati, Ruth L. Hine, Frank A. Iwen, Archie Mossman, and Charles H. Southwick.

The idea for the Emlen series occurred as a result of a gift to Sumner Matteson of Emlen's memoirs, *Adventure Is Where You Find It,* from Susie Hickey Nehls. Her support and assistance during the writing of this project are greatly appreciated. We also express our deep gratitude to Professor Stephen Emlen of Cornell University for his enthusiastic support of the series and for permission to reprint photographs from his father's book. Warren Porter and M. Deric Bownds, former and present UW-Madison Zoology Department chairs, respectively, allowed Sumner access to materials on Dr. Emlen in the department's files. Lastly, the Emlen series could not have

been completed without the cheerful support and cooperation of Mare Tracy and Liam Matteson, Sumner's wife and son.

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Cedar Waxwing *by Jack Bartholmai*

The 1998 Wisconsin Christmas Bird Counts

The 145 species reported on the 1998 Wisconsin Christmas bird count represent the third highest total for the state. Above normal temperatures kept many lakes and ponds ice-free, producing exceptional numbers of waterfowl and other species. New species for the state Christmas Count list include Greater White-fronted Goose and Wood Thrush.

by William L. Hilsenhoff

This marks the sixtieth year that Wisconsin Christmas bird counts have been published in *The Passenger Pigeon,* and the last two counts are without doubt the best in the 60-year history. The 1997 count recorded a record 153 species statewide, while the 145 species found in 1998 was only 2 less than the 147 found in 1994. No other counts have recorded 140 or more species statewide. However, the 1998 Christmas bird count will be remembered most for the exceptional numbers of most species of waterfowl and several other species.

Although the first three weeks of November were cold, 28 consecutive days of above normal high temperatures extending to December 20 left all lakes and many ponds in southern Wisconsin free of ice during the first few days of the count period. This resulted in record numbers for 20 of the 29 waterfowl listed on the report form. Many of the new records were several times the previous record. Eighteen other species also occurred in record numbers, the most impressive new records being for Sandhill Cranes, Ring-billed Gulls, American Robins, and Dark-eyed Juncos.

Throughout most of the count period there was little or no snow on the ground, except in the far north. This is detrimental to bird counts because birds are widely scattered over the landscape and not as attracted to feeders, roadsides, and stream banks as when a snow cover exists, and a lack of snow makes birds more difficult to see. Most of the counts were made before December 20, after which ponds and lakes began to freeze. Temperatures plunged near the end of December, freezing any lakes that had remained open. A blizzard on January 2 produced a thick snow cover statewide. Twelve counts were made during the blizzard, a tribute to the dedication of many bird counters.

The 1998 count produced several rarities. Heading the list were a Greater White-fronted Goose at Appleton and a Wood Thrush at Madison, the first Wisconsin Christmas count records for these species. Seen for only the second year were Lesser Black-backed Gulls at Madison and Milwaukee, a Barn Swallow at Kenosha, and a Sedge Wren at Madison. Documentation for the latter two species raised some concern and will be sent to the WSO Records Committee along with documentation for the Wood Thrush. A Western Grebe at Gurney represented only the fifth year on a Christmas count, a Barrow's Goldeneye at Milwaukee was the sixth year, and 2 Spruce Grouse at Three Lakes constituted the seventh year for that species. Other highlights included a Baltimore Oriole at Ephraim (ninth year); Sandhill Cranes on seven counts (tenth year); Peregrine Falcons on four counts and an American Woodcock at Kenosha (eleventh year); a Great Black-backed Gull at Racine (twelfth year); Thayer's Gulls at Appleton and Riveredge; Harris's Sparrows at Bayfield, Baraboo, and Madison (thirteenth year); and Harlequin Ducks at Milwaukee (4) and Sheboygan (fourteenth year).

Location and Details of the Counts

Details of the weather and participation on each count are reported in Table 1. There was a record number of counts (94) recorded this year. The Bridgeport and Racine counts arrived after Tables 2–7 had been completed and could be included only in Tables 1 and 8. This year there were new counts at Pardeeville, Warrens, and Spring Valley, and seven returning counts. Returning counts at Adams (last in 1994) and Sheboygan (last in 1980) were welcome additions. Returning counts at Burlington, Ephraim, Medford, Milton, and Plainfield were last made in 1996. Counts at Clyde, Kewaunee, LaFarge, and Spooner apparently were not repeated in 1998, and the Columbus count was cancelled because of the weather. The Pensaukee count arrived too late to be included. The Milton count severely overlapped the Fort Atkinson count (more than in Figure 1), and probably should not have been included. The only other significant overlap was between the Arpin and Wisconsin Rapids counts.

The location of each count is shown in Figure 1. Counts are numbered in groups from north to south and west to east. An alphabetical listing of counts follows and includes the count number (Figure 1), the location of the count center, and the name, address, and telephone number of the compiler. Data from counts that include areas in other states are only for species and participation in Wisconsin.

Adams (32); Arkdale; Darwin Tiede, 3040 Eagle Rd., Wisconsin Rapids, WI 54494; (715) 421-2191. **Appleton** (45); Jct. Hwys. 47 and 125; John Shillinglaw, 1952 Palisades Dr., Appleton, WI 54915; (920) 731-4222. **Arpin** (25); 0.5 mi. N of Jct. Hwy. C and Oak Rd.; Dennis Seevers, 5969 Butternut Rd., Arpin, WI 54410; (715) 569-4260. **Ashland** (3); Jct. Hwy. 2 and Sanborn Ave.; Dick Verch, 906 Ellis Ave., Ashland, WI 54806; (715) 682-5453. **Baraboo** (61); Jct. City View Rd. and Hwy. A; Kenneth Wood, 3971 Forshaug Rd., Black Earth, WI 53515; (608) 767-3343. **Bayfield** (2); T 50 N, R 5 W, S-22; Albert Roy Jr., 906 Water St., Ashland, WI 54806; (715) 682-5334. **Beloit** (78); Jct. Tracy

Table 1. Details of the 1998 Wisconsin Christmas Bird Counts.

Name of Count	Date	Sky	Snow Inches	Wind Dir.	Wind Mph.	Temp. °F		Observers		Parties	Party Hours	Owling Hours
						Low	High	Feeder	Field			
Adams	1/1	Clear	6	E	0–10	−10	9	0	1	1	10.00	0.00
Appleton	12/19	Partly Cloudy	0	W	10–20	14	25	15	23	15	97.00	2.50
Arpin	1/2	Snow	11	E	18–30	12	16	0	4	2	10.00	0.00
Ashland	12/19	Cloudy	1	E-NE	10–20	14	17	0	10	4	28.00	0.00
Baraboo	12/29	Partly Cloudy	1	NW	5–20	0	30	5	13	6	40.75	3.00
Bayfield	12/22	Partly Cloudy	9	W	8–18	−6	7	5	12	5	26.00	0.00
Beloit	12/19	Partly Cloudy	0		5	26	39	3	15	12	63.00	2.00
Black River Falls	12/19	Cloudy	1	W	20–25	20	28	7	6	3	11.60	1.16
Blanchardville	12/18	Cloudy	0	SE-SW	15–10	24	46	0	9	5	41.50	4.00
Bridgeport	12/21	PCl-MCl	0	WNW	12–15	4	26	0	19	9	62.75	4.0
Brussels	12/20	Snow	2	NE	10–20	22	29	5	10	6	33.00	2.50
Burlington	12/19	Mostly Cloudy	0	W	5–15	33	35	0	2	1	9.25	1.00
Cable	12/19	Partly Cloudy	4		calm	0	10	6	6	5	11.50	0.00
Caroline	1/2	Snow	7	ENE	20–40	12	18	10	4	3	17.00	0.00
Cassville	12/27	Cloudy-Clear	10	S-N	8–15	17	23	2	14	6	36.50	0.75
Chippewa Falls	12/26	Clear-PCl	2	S-SE	1–10	−6	16	1	8	4	30.00	0.00
Clam Lake	1/2	Snow	7	NE	5–20	0	10	0	8	4	29.00	2.00
Cooksville	1/1	Partly Cloudy	tr	E-NE	5–15	−2	10	3	5	2	13.50	2.00
Durand	12/19	Cloudy-MCl	0	W-NE	5–8	13	24	0	5	3	19.00	0.50
Ephraim	12/29	Cloudy-MCl	1	NW	10–20	10	32	14	18	9	20.50	0.00
Fifield	12/20	Snow	4	SE	0–5	10	20	21	9	5	30.50	0.00
Fond du Lac	12/19	Cloudy	0	W-NW	10–15	27	32	1	6	4	23.00	5.75
Fort Atkinson	12/27	PCl-Clear	tr	SW-W	5–20	26	36	13	14	6	21.00	0.00
Fremont	12/30	Partly Cloudy	3	NW-SW	3–7	−16	6	0	11	6	46.50	2.50
Gilman	12/20	Snow	2	NE	5	14	22	4	7	4	34.25	1.25
Grantsburg	12/19	Clear	2	N	0–12	7	10	0	9	6	37.45	0.00
Green Bay	12/19	Clear-Cloudy	tr	WNW	10–15	18	32	20	27	15	90.50	10.00
Green Lake	1/3	Partly Cloudy	7	W-NW	10–20	12	20	0	5	4	16.50	0.50
Gurney	12/20	Mostly Cloudy	12	NE	0–5			1	11	4	18.00	0.00
Hales Corners	12/19	MCl-PCl	0		0–5	25	32	3	26	13	49.70	1.50
Hartford	12/29	Snow-Clear	1	NW	15–25	6	33	0	13	7	53.75	5.25
Herbster	12/29	Cloudy-MCl	18	NW	5–12	−2	6	9	4	2	10.00	0.25

(continued)

Table 1. (Continued)

Name of Count	Date	Sky	Snow Inches	Wind Dir.	Wind Mph.	Temp. °F		Observers		Parties	Party Hours	Owling Hours
						Low	High	Feeder	Field			
Holcombe	12/30	Clear-PCl	2	NE	0–5	−20	2	0	3	2	15.00	0.00
Horicon Marsh	12/19	Cloudy	0	NW	5–10	29	33	0	4	3	24.50	1.00
Hudson	1/1	Cloudy	tr	E	12	−8	9	2	11	4	28.50	0.00
Kenosha	12/19	Cloudy-MCl	0		8–12	36	40	0	2	1	10.00	0.00
Kettle Moraine	12/30	Clear-PCl	0	NW	0–5			1	8	6	48.75	2.50
Kickapoo Valley	12/20	Snow	2	E	0–5			0	7	4	24.00	1.00
LaCrosse	12/19	Cloudy	0		5–20	21	26	4	23	11	68.25	2.00
Lake Geneva	12/19	Cloudy	0	NW	4–6	28	36	15	24	14	83.25	10.25
Lakewood	12/27	Cloudy-Clear	5	SE	5–15	12	30	0	1	1	9.00	0.00
Luck	12/21	Clear	3	NW	0–5	−2	3	13	14	7	23.00	0.00
Madison	12/19	Clear-PCl	0		5–10	17	30	14	86	40	257.00	29.00
Medford	1/2	Cloudy	6		10–25	10	14	1	10	5	35.50	0.00
Merrill	12/26	Clear	5	SW	3–5	−4	24	0	4	3	21.00	0.00
Milton	12/21	Cloudy-PCl	tr	NW	10	−10	19	0	2	1	8.50	2.50
Milwaukee	12/19	Cloudy-MCl	0	NW	9–15	30	37	10	41	16	94.25	0.50
Minoqua	1/2	Snow	12	NE	10	12	16	0	4	3	15.50	0.00
Montello	12/19	Cloudy-MCl	0	NW	10–15	20	27	12	8	5	46.00	4.50
Mount Horeb	12/27	Partly Cloudy	0	W	5–20	20	40	15	28	15	88.75	3.00
Nelson	1/2	Snow	5	NE	10–25	12	16	0	13	6	41.00	0.00
New Franken	12/19	PCl-Cloudy	0	NE	10–20	29	34	23	7	5	43.00	3.00
New Richmond	12/19	Cloudy-MCl	tr	NW	15	9	15	0	5	2	12.00	0.00
Norske	12/31	Cloudy	4			0		1	4	3	23.00	2.00
Oconomowoc	12/19		0	SW-W	0–15	25	34	3	14	5	32.00	4.00
Oshkosh	12/19	Cloudy	0	NW	8–15	28	32	4	19	10	62.00	0.00
Oxbo	12/19	MCl-PCl	3		0–5	14	28	12	7	5	19.00	0.00
Pardeeville	12/31	Clear	1	W	0–5	2	10	0	2	1	9.00	0.33
Peshtigo	12/19	Cloudy-PCl	1	NNW	5	28	32	0	5	3	25.00	1.00
Phelps	12/19	Cloudy-PCl	6	N	10–15	16	22	3	10	6	28.00	0.00
Plainfield	12/23	Partly Cloudy	5	SW-W	10–15	0	15	7	6	4	39.00	3.50
Platteville	12/20	Cloudy	tr			20	25	2	8	4	20.00	0.00
Plymouth	12/19	Cloudy	tr	NW	10–20	27	30	3	16	6	42.00	0.00

Poynette	1/2	Snow	4	E	15–25	15	20	19	17	9	36.75	0.50
Racine	12/19	Clear	0		5–10	30	35	2	14	7	48.00	1.00
Randolph	1/2	Snow	4	E-NE	20–35	17	19	2	2	2	9.25	0.00
Rhinelander	12/19	Partly Cloudy	3	NW	10	18	30	23	6	1	1.50	0.50
Richland Center	12/19	Cloudy	0	NW	8–12	20	26	4	36	20	96.00	5.00
Riveredge	12/19	Cloudy-MCl	0	W	5–10	21	28	29	78	22	186.70	23.50
Sauk City	12/26	Partly Cloudy	0		calm			1	24	14	83.00	2.50
Seymour	12/26	Clear	tr	NNW-SW	5–12	7	16	0	1	1	9.50	0.50
Shawano	12/19	Cloudy-PCl	tr	WNW-NE	5–20	22	28	6	5	4	24.00	2.00
Sheboygan	1/2	Cloudy	3	NE	25–30	5	20	1	4	2	15.00	1.00
Shiocton	12/18	Partly Cloudy	0	S	0–10	29	42	4	22	6	45.75	2.50
Spencer	12/30	Clear	5	SE	2–5	−20	0	4	11	7	59.50	3.75
Spring Valley	12/27	Clear-Cloudy	1		10–15	15	24	0	4	2	16.00	0.00
Spruce	1/2	PCl-Snow	5	NE	10–30	17	19	1	4	2	15.50	0.50
Stevens Point	12/19	Cloudy	1	N	10	24	27	0	33	8	53.00	0.00
Stockbridge	12/22		1	W	5–10	−4	5	0	8	5	25.45	1.00
Sturgeon Bay	12/19	Cloudy	1	NW	15–25	25	31	24	26	13	76.00	1.50
Three Lakes	12/20	Cloudy-Snow	4	SE	5	10	20	2	6	4	17.00	0.00
Trempealeau	1/2	Snow	6	N	14	8	17	6	18	8	39.50	1.00
Warrens	12/27	Cloudy-Clear	2	W-SW	15	18	31	7	9	6	23.00	3.00
Waukesha	12/19	Partly Cloudy	tr	W-NW	12–20	25	34	1	28	12	57.25	3.50
Waupaca	12/28	Clear-PCl	2	S	0–8	−4	31	3	3	3	23.50	1.50
Wausau	12/19	MCl-Cloudy	2	NNW	5–15	19	34	4	16	10	60.50	2.75
Wautoma	12/30	Clear-MCl	4		0–5	−17	4	52	8	5	24.50	2.00
Willard	12/27	Cloudy-MCl		SW	5–10	26	27	4	13	5	42.75	3.25
Wisconsin Rapids	12/19	Partly Cloudy	tr	NW	5–20	18	27	4	14	10	41.25	1.00
Woodland Dunes NW	1/2	Cloudy-Snow	4	E	15–30	17	19	1	9	5	17.00	0.00
Woodland Dunes NE	1/3	Clear	15	NW	10–20	10	18	5	5	5	26.50	0.00
Woodland Dunes SW	12/19	Cloudy	1	W	10–20	25	30	0	8	6	20.00	0.00
Woodland Dunes SE	12/21	Snow-Cloudy	1	E-SE	10–15	25	30	1	9	7	31.00	0.00
TOTAL*								501	1,138	577	3,450.65	181.24

*Bridgeport and Racine counts are not included in totals.

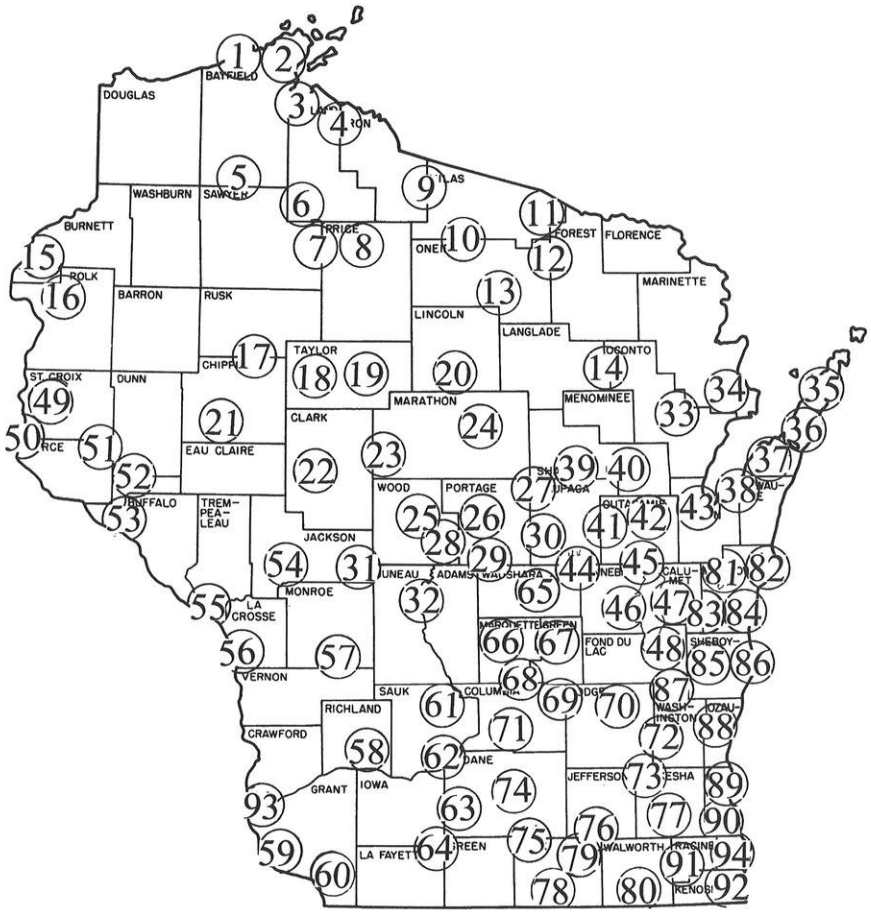

Figure 1. Locations of the 1998 Wisconsin Christmas Bird Counts.

and Eau Claire Rd.; Brad Paulson, 15034 Carroll St., Broadhead, WI 53520; (608) 879-2647. **Black River Falls** (54); Jct. Hwys. H and 54; Judy Allen, W12866 River Rd., Black River Falls, WI 54615; (608) 488-4154. **Blanchardville** (64); 2.5 miles SW of Blanchardville; David Willard, Bird Division, Field Museum of Natural History, Roosevelt Rd. at Lakeshore Dr., Chicago, IL 60605; (312) 922-9410 ext. 269 (work). **Bridgeport** (late-93); Hwy. 18 bridge over Wisconsin R.; Al Shea, 2765 Northwynde Passage, Sun Prairie, WI 53590; (608) 825-6232. **Brussels** (37); Jct. Hwy. 57 and Stevenson Pier Rd.; Charlotte Lukes, 3962 Hillside Rd., Egg Harbor, WI 54209; (920) 823-2478. **Burlington** (91); Jct. Hwy A and Crossway Rd.; John Bielefeldt, Box 283, Rochester, WI 53167; (414) 514-2376. **Cable** (5); Cable; Carol Hannah, P.O. Box 416, Cable, WI 54821; (715) 798-3890. **Caroline** (39); 2 miles W of Caroline; Mark Peterson, Box 53, Caroline, WI 54928; (715) 754–2661. **Cass-**

ville (59); Jct. Garden Prairie Rd. and Muskellunge Rd.; William Mueller, 1242 S. 45th St., Milwaukee, WI 53214; (414) 643-7279. **Chippewa Falls** (21); Jct. Hwys. 178 and S; C.A. Kemper, 733 Maple St., Chippewa Falls, WI 54729; (715) 723-3815. **Clam Lake** (6); 7 miles SE of Clam Lake; Keith Merkel, 11722 Robin Rd., Marshfield, WI 54449; (715) 384-2383. **Clyde** (no report); Jct. Hwy. ZZ and Weaver Rd.; Steven Greb, 1714 Labrador Rd., Oregon, WI 53575; (608) 221-6362. **Columbus** (cancelled); Jct. Johnson and Jahnke Sts.; Larry Michael, 116 S. Nebraska St., Horicon, WI 53032; (920) 485-2936. **Cooksville** (75); Cooksville; David and Anna Marie Huset, 242 W. Church St., Evansville, WI 53536; (608) 882-5648. **Durand** (52); Jct. Hwys. 25 and DD, 3 miles N of Durand; C.A. Kemper, 733 Maple St., Chippewa Falls, WI 54729; (715) 723-3815. **Ephraim** (35); Hwy. A 3 miles S of Jct. with Hwy 42; Paul and Kathleen Regnier, P.O. Box 152, Baileys Harbor, WI 54202; (920) 839-2802 or 868–2690. **Fifield** (8); Fifield Post Office; Thomas Nicholls, 2160 Draper Ave., Roseville, MN 55113; (612) 636-2592. **Fond du Lac** (48); Jct. Tower and Cody Roads; Jeff Baughman, W8985 Hwy. SS, Adell, WI 53001; (414) 626-4713. **Fort Atkinson** (76); Jct. S. Main St. and Hackbarth Ave.; Richard Wanie, W5920 Lee Dr., Fort Atkinson, WI 53538; (920) 563-6274. **Fremont** (44); Jct. Hwys. I and HH, 4 miles SW of Fremont; Daryl Tessen, 3118 N. Oneida St., Appleton, WI 54911; (920) 735–9903. **Gilman** (18); 1 mile W of Miller Dam; Janice Luepke, B-894 Eau Pleine Rd., Spencer, WI 54479; (715) 659-3910. **Grantsburg** (15); Jct. Hwys. 70 and 48; Dennis Allaman, 506 W. St. George Ave., Grantsburg, WI 54840; (715) 463-2365. **Green Bay** (43); Jct. Allouez and S. Webster Avenues; John Jacobs, Neville Public Museum, 210 Museum Pl., Green Bay, WI 54303; (920) 448-4460. **Green Lake** (67); Jct. Hwy. J and Swamp Rd.; Thomas Schultz, N6104 Honeysuckle Lane, Green Lake, WI 54941; (920) 294-3021. **Gurney** (4); Hwy. 169 in Gurney; Joan Elias, HCI Box 780, Saxon, WI 54559; (715) 893-2358. **Hales Corners** (90); Jct. 27th St. and Rawson Ave., (Milwaukee Co. only); Debra McRae, Wehr Nature Center, 9701 W. College Ave., Franklin, WI 53123; (414) 425-8550. **Hartford** (72); Jct. Hwys. 60 and 83; Judy Haseleu, 337 W. State St., Hartford, WI 53027; (414) 673–5865. **Herbster** (1); Hwy. 13, 1 mile west of Herbster; Phyllis Johnson, P.O. Box 303, Cornucopia, WI 54827; (715) 742-3960. **Holcombe** (17); Chippewa-Rusk County line 1 mile E of Hwy. 27; C.A. Kemper, 733 Maple St., Chippewa Falls, WI 54729; (715) 723-3815. **Horicon Marsh** (70); Jct. Main Ditch and Main Dike in Refuge; Bill Volkert, DNR, N7725 Hwy. 28, Horicon, WI 53032; (920) 387–7877. **Hudson** (50); Afton, MN; Helen Lien, 5148 29th Ave. S., Minneapolis, MN 55417; (612) 729-5982. **Kenosha** (92); Jct. Hwys. 158 and HH (Kenosha Co. only); Ron Hoffmann, Box 886, Kenosha, WI 53141; (414) 654-5854. **Kettle Moraine** (87); Hwy. DD, W of Auburn Lake; Bill Volkert, W996 Birchwood Dr., Campbellsport, WI 53010; (920) 533-8939. **Kewaunee** (no report); Jct. Hwys. 42 and D; William Mueller, 1242 S. 45 St., Milwaukee, WI 53214; (414) 643-7279. **Kickapoo Valley** (57); Jct. Hwys. T and 131; Eric Epstein, 22505 Kensington Rd., Norwalk, WI 54648; (608) 823-7837. **LaCrosse** (56); LaCrosse Courthouse; Fred Lesher, 509 Winona St., LaCrosse, WI 54603; (608) 783-1149.

LaFarge (no report); Jct. Hwys. 131 and 82; Dan Hazlett, P.O. Box 264, LaFarge, WI 54639. **Lake Geneva** (80); Interlaken Lodge, Hwy. 50; Patricia Parsons, N3241 North Williams St., Lake Geneva, WI 53147; (414) 248-1232. **Lakewood** (14); Jct. Hwys. T and FR 2117; John Woodcock, 1114 28th St., Two Rivers, WI 54241; (920) 794-1154. **Luck** (16); Jct. 180th St. and 180th Ave. in Polk Co.; John Nygren, 920 3rd Ave., Luck, WI 54853; (715) 472-2508. **Madison** (74); State Capitol; Carol Anderson and Tony Kalenic, 4638 Bonner Lane, Madison, WI 53704; (608) 249-8836. **Manitowish Waters** (9); Jct. Hwy. 51 and Hwy. W; John Bates, Hwy. 47, #2263, Mercer, WI 54547; (715) 476-2828. **Medford** (19); 2.5 miles NE of Whittlesey; Susanne Adams, 850 N. 8th St., Hwy 13, Medford, WI 54451; (715) 748–4875. **Merrill** (20); Jct. South End Rd. and Hwy. 107; Alan Rusch, 3342 Westview Lane, Madison, WI 53713; (608) 274-1224. **Milton** (79); Milton; Katy Hess, 5611 E. Eagle Dr., Milton, WI 53563; (608) 868-2972. **Milwaukee** (89); Jct. Port Washington Rd. and Hampton Ave.; Marilyn Bontly and Jean Strelka, Schlitz Audubon Center, 1111 E. Brown Deer Rd., Milwaukee, WI 53217; (414) 351–4200. **Minoqua** (10); Jct. Hwy 51 and Hwy 70 West; Paul Bowman Jr., 9020 Hwy J, Woodruff, WI 54568; (715) 356-7542. **Montello** (66); Harrisville; Daryl Christensen, N6053 Hwy. Y, Montello, WI 53949; (608) 296-3068. **Mount Horeb** (63); Jct. Hwys. 78 and Bus. 18; Kenneth Wood, 3971 Forshaug Rd. Black Earth, WI 53515; (608) 767-3343. **Nelson** (53); 1 mile S of Jct. Hwys. I and D; C.A. Kemper, 733 Maple St., Chippewa Falls, WI 54729; (715) 723-3815. **New Franken** (38); Jct. Hwys. P and SS; Ed Houston, 2818 Sugarbush Ct., Green Bay, WI 54301; (920) 339-3273. **New Richmond** (49); 2 miles E of Boardman; Joseph Merchak, 210 Ilwaco Rd., River Falls, WI 54022; (715) 425-1169. **Norske** (27); 1 mile E of Jct. Hwy P and Rustad Rd.; Janet Avis Hewitt, E1047 Paulson Rd., Iola, WI 54945; (715) 445-2489. **Oconomowoc** (73); Hwy 67, 2 miles N of Oconomowoc; Alex Kailing, W330 N8275 W. Shore Dr., Hartland, WI 53029; (414) 966–1072. **Oshkosh** (46); Jct. Hwys. 21 and 41; Thomas Ziebell, 1322 Ceape Ave., Oshkosh, WI 54901; (920) 235-0326. **Oxbo** (7); Jct. Hwys. EE and 70; Larry Gregg, 829 Atwood Ave., Park Falls, WI 54552; (715) 762-3446. **Pardeeville** (68); Jct. Monthey and Starr Rds.; Paul and Glenna Schwalbe, 203 Breezy Point Dr., Pardeeville, WI 53954; (608) 429-4365. **Pensaukee** (too late); Pensaukee; Thomas Erdman, 4093 Hwy. S, Route 2, Oconto, WI 54153; (920) 834-3416. **Peshtigo** (34); Harmony Corners; Leo Feller, 530 Rainbow Circle, Peshtigo, WI 54157; (715) 582-3373. **Phelps** (11); Jct. FR 2199 and FR 2533, 2 miles SW of Phelps; Bill Reardon, 2547 Hwy. 70 E, Eagle River, WI 54521; (715) 479-8055. **Plainfield** (29); Jct. Hwy. BB and 3rd Ave. NW of Almond; Don Nussbaum, 1544 Ames St., Neenah, WI 54956; (920) 729-9137. **Platteville** (60); Cornelia: Tom Goltry, 660 Pioneer Rd., Platteville, WI 53818; (608) 348-9666. **Plymouth** (85); Jct. Hwys. 23 and Country Aire Rd.; Harold Koopman, 415 Caroline St., Plymouth, WI 53073; (920) 892-8101. **Poynette** (71); Jct. Hwys. 51 and CS; Mark and Sue Martin, Goose Pond Sanctuary, W7468 Prairie Lane, Arlington, WI 53911; (608) 635-4160. **Racine** (late-94); Hwy. H, 0.5 miles S of Hwy. K (Racine Co. only); Gerald DeBoer, 15935 2 Mile

Rd., Franksville, WI 53126; (414) 835-4642. **Randolph** (69); Hwy P midway between Cambria and Randolph; Larry Michael, 116 S. Nebraska St., Horicon, WI 53032; (920) 485-2936. **Rhinelander** (13); Rhinelander; Ced Vig, 919 Birch Bend, Rhinelander, WI 54017; (715) 362-3047. **Richland Center** (58); Jct. Hwys. O and TB, SE of Richland Center; Robert Hirschy, University of Wisconsin Center-Richland, 1200 Hwy. 14 West, Richland Center, WI 53581; (608) 647-6186. **Riveredge** (88); Jct. Hwy. 33 and Lakeland School Rd.; Mary Hollebeck, c/o Riveredge Nature Center, P.O. Box 26, Newburg, WI 53060; (414) 375-2715. **Sauk City** (62); 2.5 miles SE of Witwen; Nancy Raffetto, 9437 Hwy Y, Sauk City, WI 53583; (608) 643-1274. **Seymour** (42); Jct. Hwy. C and Culbertson Rd.; Daryl Tessen, 3118 N. Oneida, Appleton, WI 54911; (920) 735-9903. **Shawano** (40); 3 miles N of Lunds; Mark Peterson, Box 53, Caroline, WI 54928; (715) 754-2661. **Sheboygan** (86); Jct. 10th St. and Erie Ave.; Scott Baughman, 133 Park Ave., Sheboygan, Ave. 53081; (920) 459-9845. **Shiocton** (41); Jct. Hwys. M and 54; James Anderson, Mosquito Hill Nature Center, N3880 Rogers Rd., New London, WI 54961; (920) 779-6433. **Spencer** (23); Jct. Hwys. F and 153; Janice Luepke, B-894 Eau Pleine Rd., Spencer, WI 54479; (715) 659-3910. **Spooner** (no report); Jct. Hwys. 63 and K; Mary Griedbach Cahow, 513 Dale St., Apt. #3, Spooner, WI 54801; (715) 635-2978. **Spring Valley** (51); Jct. Hwy. CC and 690th Ave. in Olivet; Nathan Carlsen, W301 N Second St., Spring Valley, WI 54767; (715) 778-5778. **Spruce** (33); 1.5 miles N of Spruce on Hwy. B; Jerry Smith, 6865 Fredrickson Road, Lena, WI 54139; (920) 829–6353. **Stevens Point** (26); Old Main Bldg., U.W. Stevens Point; Nancy Stevenson, 1890 Red Pine Lane, Stevens Point, WI 54481; (715) 341-0084. **Stockbridge** (47); 3 miles SE of Stockbridge; Carroll Rudy, W3866 Hwy. H, Chilton, WI 53014; (920) 849-9021. **Sturgeon Bay** (36); Jct. Hwys. 57 and P; Charlotte Lukes, 3962 Hillside Rd., Egg Harbor, WI 54209; (920) 823-2478. **Three Lakes** (12); 6 miles E of Three Lakes; Bill Reardon, 2547 Hwy. 70 E, Eagle River, WI 54521; (715) 479-8055. **Trempealeau** (55); Jct. Hwy K and Fremont St., Trempealeau; Thomas Hunter, 11675 Jay St., P.O. Box 114, Trempealeau, WI 54661; (608) 534-6233. **Warrens** (31); Jct. Hwys. HH and O; Louise Olson, W3091 Olson Rd., Warrens, WI 54666; (608) 378-4617. **Waukesha** (77); Jct. Hwy. D and Brookhill Rd.; Patrick Horn, 576W19840 Sunny Hill Dr., Muskego, WI 53150; (414) 679-1459. **Waupaca** (30); Jct. Hwy. 49 and Smokey Valley Rd.; Daryl Tessen, 3118 N. Oneida St., Appleton, WI 84911; (920) 735-9903. **Wausau** (24); Jct. Grand Ave. and Thomas St.; Dan Belter, 523 Mobile Ave., Wausau, WI 54403; (715) 842-9406. **Wautoma** (65); Mount Morris; Delbert Greenman, N4344 Hwy W, Redgranite, WI 54970; (920) 787-3036. **Willard** (22); 1 mile E and 1.5 miles S of Willard; Janice Luepke, B-894 Eau Pleine Rd., Spencer, WI 54479; (715) 659-3910. **Wisconsin Rapids** (28); Wisconsin Rapids Airport; Darwin Tiede, 3040 Eagle Rd., Wisconsin Rapids, WI 54494; (715) 421-2191. **Woodland Dunes NW** (81); Menchalville; **NE** (82); Mishicot; **SW** (83); 3 miles W of St. Nazianz on Hwy. C; and **SE** (84); 2 mi. S of Newtonburg; all only in Manitowoc Co., as drawn on a map; Bernard Brouchoud, Woodland Dunes Nature Center, P.O. Box

2108, Manitowoc, WI 54221-2108; (920) 793-4007.

Results of the Counts

Results are reported in Tables 2–8. Common species are reported in Tables 2–7, with counts in similar areas of the state grouped together in each table. The number of individuals of each species is compared in Table 7 with the average for the previous ten years, corrected for participation (total party hours). Numbers of uncommon and rare species are reported in Table 8, with counts listed in the same order as in Tables 2–7. Undocumented reports of species for which documentation was requested were not included. These were a Ruby-crowned Kinglet, a Black-crowned Night-Heron (period), a Greater White-fronted Goose (period), a Virginia Rail, Blue-winged Teal on two counts, a White-eyed Vireo, and a Cinnamon Teal. Not included because of inadequate documentation were 50 Blue -winged Teal, 2 Chipping Sparrows, a Turkey Vulture, and a Broad-winged Hawk. A Chukar at Kenosha and some Northern Bobwhites at Phelps were probably released birds and were not included.

Most counts reported more species than usual and several recorded a record number. Exceptions were the 12 counts made during the January blizzard. There were 24 counts reporting 50 or more species, most of them from the southern half of the state. Madison had the highest total (92) followed by Bridgeport (75), Oshkosh and Montello (74), Riveredge (73), Appleton and Milwaukee (72), Lake Geneva (69), Sauk City (68), Shawano and LaCrosse (65), and Green Bay (61). Only two counts reported fewer than 20 species. A summary of general abundance within various groups of species follows. "Average" refers to comparison with the previous 10 years.

Loons, Grebes, and Cormorants—Counts of Common Loons (18), Pied-billed Grebes (30), and Double-crested Cormorants (42) were all records. Horned Grebes were found at Green Bay, Madison, and Milwaukee. A Western Grebe at Gurney was an exceptional find.

Herons—Great Blue Herons occurred in about normal numbers.

Swans and Geese—The record number of Snow Geese (344) was 5.4 times the previous record (64). Mute (105), Trumpeter (47), and Tundra (1078) Swans all were found in record numbers, and the count of 360,774 Canada Geese was 86% above average.

Ducks and Mergansers—The unprecedented amount of open water enticed migratory ducks and mergansers to remain in Wisconsin until after Christmas. Record numbers were reported for 12 species as follows: 1,932 Gadwalls (2.9 times the previous record); 591 American Wigeons (9.5 times previous record); 50,327 Mallards (1.3 times previous record); 901 Northern Shovelers (2.1 times previous record); 94 Northern Pintails (7.8 times previous record); 83 Green-winged Teal (6.9 times previous record); 6,662 Canvasbacks, mostly on the Mississippi River at Bridgeport and LaCrosse (7 times previous record); 160 Ring-necked Ducks (1.4 times previous record); 1,154 Lesser Scaup (2.7 times previous record); 2,194 Buffleheads (1.6 times previous record); 217

Hooded Mergansers (1.4 times previous record); and 3,518 Red-breasted Mergansers (4.4 times previous record). Most other species occurred in above average numbers, with the highest number of American Black Ducks since 1989 and the highest number of Greater Scaup since 1969. Exceptions were Oldsquaws (lowest total since 1980), Common Goldeneyes (20% below average), and only average numbers of Common Mergansers. In addition to exceptional numbers reported above, other highlights included a Barrow's Goldeneye at Milwaukee, 4 Harlequin Ducks at Milwaukee and one at Sheboygan, and a White-winged Scoter at Milwaukee.

Hawks and Eagles—A record 200 Northern Harriers (previous high of 131 in 1994), a record number of Merlins (7), and 4 Peregrine Falcons were the most notable hawk observations. Numbers of Cooper's (129) and Sharp-shinned (95) Hawks also remained high. Counts of other species were about normal, except for the Northern Goshawk, which was 41% below average. While a record 12 Golden Eagles were sighted, Bald Eagle numbers were down somewhat, probably because of the large amount of open water available to them.

Grouse, Pheasants, Quail, etc.—A lack of snow made it more difficult to locate most of these species. This was reflected in below average numbers of Ring-necked Pheasants, only 17 Gray Partridges (83% below average), and only 2 Northern Bobwhites, the lowest total since 1979. Ruffed Grouse, which hide in the snow, were found to be more abundant (38% above average). Wild Turkeys, which are easily seen because of their size, occurred in record numbers (6,540, 1.3 times previous record). The only Sharp-tailed Grouse (13) were found at Grantsburg, and all the Greater Prairie-Chickens were seen at Plainfield, where two flocks numbered 127, a new record. The 2 Spruce Grouse at Three Lakes were a highlight.

Rails, Coots, Cranes, and Shorebirds—The fantastic count of 6,019 Sandhill Cranes on 7 counts (previous record 14) and a record 12,580 American Coots (2.1 times previous record) highlight this group. Most of the cranes were in a staging area near Lake Geneva. The 12 Killdeer were the most since 1981, while the 31 Common Snipe were about average. Other highlights were an American Woodcock at Kenosha, and Purple Sandpipers and a Ruddy Turnstone during the count period at Sheboygan.

Gulls—Ring-billed Gulls (a record 19,033), which have always been outnumbered by Herring Gulls on Christmas counts, were almost twice as abundant as Herring Gulls this year. The number of Bonaparte's Gulls was unusually low considering the weather, while Glaucous Gulls appeared in about average numbers. Unusual sightings included Lesser Black-backed Gulls at Madison and Milwaukee, Thayer's Gulls at Appleton and Riveredge, and a Great Black-backed Gull at Racine.

Doves—Rock Doves and Mourning Doves occurred in slightly below average numbers.

Owls—A record 44 Short-eared Owls were found (1.3 times previous

Table 2. Number of each species found on 15 or more counts in northern Wisconsin.

Species	Herbster 1	Bayfield 2	Ashland 3	Gurney 4	Cable 5	Clam Lake 6	Oxbo 7	Fifield 8	Manitowish Waters 9	Minoqua 10	Phelps 11	Three Lakes 12	Rhine-lander 13	Lake-wood 14	Grants-burg 15	Luck 16
Great Blue Heron	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Canada Goose	0	0	112	0	0	0	0	x	0	0	0	0	36	0	2996	114
Mute Swan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gadwall	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
American Black Duck	0	0	56	0	0	0	0	0	0	1	0	0	0	0	0	0
Mallard	0	14	91	0	0	0	0	1	0	23	0	0	24	0	41	0
Lesser Scaup	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0
Bufflehead	0	0	x	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Goldeneye	0	16	92	0	0	0	0	1	0	0	1	0	0	0	1	0
Hooded Merganser	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Merganser	0	88	53	0	0	0	0	0	0	0	80	0	2	0	1	0
Red-breasted Merganser	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Bald Eagle	2	3	1	9	3	1	11	5	7	3	16	1	8	0	3	10
Northern Harrier	0	0	x	0	0	0	0	0	0	0	0	0	0	0	1	0
Sharp-shinned Hawk	0	0	0	0	x	0	0	0	0	0	0	0	0	0	1	0
Cooper's Hawk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red-tailed Hawk	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3	x
Rough-legged Hawk	0	0	2	1	0	0	1	1	1	0	0	0	0	0	6	x
American Kestrel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ring-necked Pheasant	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	6
Ruffed Grouse	3	1	6	17	14	20	40	36	24	1	10	7	4	1	9	7
Wild Turkey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	12
American Coot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Snipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ring-billed Gull	0	1	10	0	0	0	0	0	0	0	10	0	0	0	0	0
Herring Gull	13	156	109	0	0	0	0	0	0	0	0	0	0	0	0	14
Rock Dove	0	4	64	0	0	0	0	122	2	3	2	0	2	0	172	70
Mourning Dove	0	43	4	2	0	0	41	57	0	1	11	17	165	2	3	17
Eastern Screech-Owl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Great Horned Owl	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Barred Owl	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	x
Belted Kingfisher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red-headed Woodpecker	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Red-bellied Woodpecker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	19
Downy Woodpecker	16	9	3	6	15	14	27	25	8	3	31	37	40	8	23	83

Hairy Woodpecker	7	7	1	10	11	7	31	30	14	5	18	8	53	2	11	42
Northern Flicker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pileated Woodpecker	0	0	0	3	x	0	3	5	1	0	4	3	8	2	4	6
Northern Shrike	1	3	1	0	0	2	2	x	0	0	1	0	0	0	3	0
Blue Jay	23	98	23	28	43	8	71	50	45	22	33	33	57	6	60	117
American Crow	20	46	90	48	45	24	88	298	112	21	81	48	32	41	84	92
Common Raven	22	90	3	44	12	58	50	88	39	17	49	16	7	3	7	5
Horned Lark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Black-capped Chickadee	145	183	99	118	194	209	311	541	297	117	303	212	297	38	390	400
Tufted Titmouse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red-breasted Nuthatch	17	8	6	3	38	36	44	74	34	10	51	45	25	3	5	11
White-breasted Nuthatch	10	12	10	6	31	11	38	30	28	8	29	13	59	7	36	112
Brown Creeper	0	0	0	0	2	0	2	4	0	0	2	1	3	1	0	1
Golden-crowned Kinglet	1	0	0	0	0	3	0	1	2	2	0	3	0	0	0	0
American Robin	0	3	0	0	0	0	0	x	0	0	0	0	1	0	2	x
European Starling	16	54	158	14	6	0	25	135	0	3	25	21	0	3	38	8
Cedar Waxwing	0	0	0	0	0	0	0	0	0	0	0	0	50	0	54	0
American Tree Sparrow	0	1	0	4	0	0	6	5	4	6	0	0	4	0	57	14
Song Sparrow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Swamp Sparrow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-throated Sparrow	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Dark-eyed Junco	0	29	13	0	2	0	9	10	6	1	4	3	16	10	14	0
Lapland Longspur	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Snow Bunting	0	0	50	0	0	0	6	50	x	0	1	20	100	25	56	0
Northern Cardinal	0	1	10	1	1	0	0	3	0	0	0	0	5	0	3	79
Red-winged Blackbird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Grackle	0	6	0	0	1	0	0	0	1	0	0	0	4	0	0	10
Purple Finch	26	47	7	80	79	233	62	240	40	16	64	95	73	4	0	3
House Finch	0	17	81	0	0	0	0	1	0	0	1	0	5	0	0	40
Common Redpoll	13	0	0	0	0	0	10	5	0	0	0	0	27	0	12	15
Pine Siskin	0	125	44	0	7	225	36	38	3	2	43	53	7	0	41	0
American Goldfinch	103	190	19	36	201	173	391	369	303	481	346	315	196	26	200	210
Evening Grosbeak	0	115	15	54	70	183	224	127	13	4	64	106	160	0	0	25
House Sparrow	0	2	48	0	0	0	0	0	0	0	0	30	0	0	149	215
Total Species	**18**	**36**	**40**	**21**	**20**	**21**	**28**	**37**	**24**	**22**	**29**	**26**	**35**	**18**	**41**	**33**

x = Found within 3 days of the count day but not on the day of the count.

Table 3. Number of each species found on 15 or more counts in central Wisconsin.

Species	Holcombe 17	Gilman 18	Medford 19	Merrill 20	Chippewa Falls 21	Willard 22	Spencer 23	Wausau 24	Arpin 25	Stevens Point 26	Norske 27	Wisconsin Rapids 28	Plainfield 29	Waupaca 30	Warrens 31	Adams 32
Great Blue Heron	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Canada Goose	0	0	0	14	216	0	0	170	0	373	0	497	0	12	0	76
Mute Swan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gadwall	0	0	0	0	0	0	0	10	0	10	0	0	0	0	0	0
American Black Duck	0	0	0	0	52	0	0	7	0	10	0	7	0	0	0	0
Mallard	0	0	70	39	287	0	0	420	0	735	0	346	1	58	0	40
Lesser Scaup	0	0	0	0	0	0	0	11	0	0	0	1	0	0	0	0
Bufflehead	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Goldeneye	0	0	0	0	45	0	0	6	0	47	0	164	0	0	0	6
Hooded Merganser	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0
Common Merganser	0	0	0	0	0	0	0	3	0	6	0	0	0	0	0	4
Red-breasted Merganser	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bald Eagle	0	1	0	1	5	14	1	3	0	8	5	1	0	1	3	4
Northern Harrier	0	0	0	0	0	0	1	1	0	5	x	3	1	0	2	0
Sharp-shinned Hawk	0	1	0	0	1	1	1	1	0	1	x	1	0	1	0	0
Cooper's Hawk	0	0	0	0	0	0	3	x	0	1	x	1	1	2	0	0
Red-tailed Hawk	3	1	1	0	19	19	34	18	3	13	12	6	8	22	5	1
Rough-legged Hawk	1	3	1	1	10	10	4	2	0	14	6	6	0	10	3	3
American Kestrel	0	0	0	0	0	2	1	1	1	2	1	2	2	1	2	0
Ring-necked Pheasant	0	0	2	0	0	0	2	0	2	0	1	1	1	7	2	0
Ruffed Grouse	0	30	27	7	7	14	26	10	1	8	x	0	0	6	17	0
Wild Turkey	0	0	0	0	9	333	1	8	x	8	156	85	53	393	242	140
American Coot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common Snipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ring-billed Gull	0	0	0	0	0	0	0	23	0	41	0	2	0	0	0	0
Herring Gull	0	0	0	0	0	0	0	2	0	10	0	15	0	0	0	0
Rock Dove	65	142	3	179	277	345	562	347	81	205	160	47	133	464	42	4
Mourning Dove	10	137	19	27	113	80	165	279	18	83	21	75	124	101	50	0
Eastern Screech-Owl	0	0	0	0	0	0	0	0	0	0	x	0	0	1	2	0
Great Horned Owl	1	3	0	0	0	4	5	1	1	1	1	1	3	3	4	0
Barred Owl	0	0	0	0	0	1	2	0	0	3	0	0	2	0	2	0
Belted Kingfisher	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0
Red-headed Woodpecker	0	0	0	0	1	0	3	0	0	1	0	0	0	0	0	1
Red-bellied Woodpecker	1	5	0	0	13	22	10	4	2	15	7	6	4	25	16	6
Downy Woodpecker	13	45	37	11	47	47	103	36	7	46	17	17	17	57	33	2

Hairy Woodpecker	1	25	13	3	7	17	28	20	2	30	12	11	9	12	11	2
Northern Flicker	0	0	0	0	0	0	0	0	1	0	0	0	1	2	1	0
Pileated Woodpecker	0	1	2	2	2	2	3	3	0	1	x	1	2	2	1	0
Northern Shrike	2	11	2	0	0	9	5	6	x	5	1	1	2	1	1	0
Blue Jay	47	93	51	12	113	86	148	82	18	103	59	14	72	131	80	20
American Crow	131	159	340	63	562	500	317	479	25	539	142	232	177	378	122	8
Common Raven	1	41	10	0	0	7	1	1	0	0	6	0	3	4	8	2
Horned Lark	4	0	0	0	59	74	165	0	40	0	7	x	48	19	3	0
Black-capped Chickadee	86	579	490	111	198	486	542	369	65	476	210	144	153	229	118	15
Tufted Titmouse	0	0	0	0	31	0	0	0	0	0	0	0	0	0	0	0
Red-breasted Nuthatch	2	21	11	9	3	2	3	17	0	19	1	17	1	3	25	3
White-breasted Nuthatch	8	41	30	6	37	72	66	38	5	55	23	15	21	73	48	2
Brown Creeper	0	0	0	2	1	0	0	3	0	8	0	1	0	1	1	1
Golden-crowned Kinglet	0	7	7	0	0	0	0	0	0	0	2	4	0	1	2	0
American Robin	0	1	8	19	4	21	3	2	0	167	4	78	8	80	1	2
European Starling	69	212	47	56	201	360	325	604	28	436	23	17	373	841	101	5
Cedar Waxwing	0	0	0	25	24	0	0	63	0	0	x	22	0	10	24	0
American Tree Sparrow	293	273	72	2	447	411	607	38	217	129	435	62	622	218	60	20
Song Sparrow	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Swamp Sparrow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White-throated Sparrow	0	1	0	0	0	0	0	0	0	0	0	0	x	0	0	0
Dark-eyed Junco	32	46	79	12	218	185	131	125	51	421	361	74	1429	578	78	61
Lapland Longspur	0	1	0	0	83	0	5	3	0	140	0	0	2	0	0	0
Snow Bunting	210	406	220	0	38	11	323	95	8	27	167	x	268	80	40	0
Northern Cardinal	4	14	28	8	53	70	104	54	18	87	25	12	59	38	24	3
Red-winged Blackbird	0	0	1	0	0	0	0	5	0	0	0	0	0	0	0	0
Common Grackle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Purple Finch	0	76	153	13	26	21	5	33	0	28	43	4	10	26	9	0
House Finch	0	6	8	0	10	4	5	75	0	64	31	15	14	15	13	0
Common Redpoll	0	0	0	0	0	0	0	90	0	0	0	2	0	0	0	0
Pine Siskin	0	4	8	2	0	0	0	1	0	2	125	0	0	0	0	0
American Goldfinch	76	65	345	23	29	360	108	87	48	103	106	13	49	275	98	0
Evening Grosbeak	0	0	6	0	0	10	0	0	0	0	0	2	0	0	0	0
House Sparrow	68	573	486	43	333	1138	1992	652	105	380	56	123	44	373	71	2
Total Species	**24**	**36**	**33**	**28**	**40**	**34**	**40**	**53**	**23**	**47**	**34**	**45**	**38**	**44**	**42**	**28**

x = Found within 3 days of the count day but not on the day of the count.

Table 4. Number of each species found on 15 or more counts in northeast Wisconsin.

Species	Spruce 33	Pesh-tigo 34	Ephraim 35	Sturgeon Bay 36	Brussels 37	New Franken 38	Caro-line 39	Sha-wano 40	Shioc-ton 41	Sey-mour 42	Green Bay 43	Fre-mont 44	Apple-ton 45	Osh-kosh 46	Stock-bridge 47	Fond du Lac 48
Great Blue Heron	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Canada Goose	0	428	0	1575	815	443	5	766	148	7	10801	1	5755	2793	7	3702
Mute Swan	0	0	11	0	0	0	0	3	0	0	0	0	0	0	0	2
Gadwall	0	0	0	0	0	0	4	13	0	0	x	0	46	8	0	0
American Black Duck	0	0	0	51	65	0	2	5	0	0	572	7	43	16	0	52
Mallard	3	45	29	581	115	15	128	249	18	0	2770	193	2363	1670	0	223
Lesser Scaup	0	0	0	0	0	0	0	1	0	0	0	0	18	24	0	37
Bufflehead	0	0	6	409	1	10	0	14	0	0	0	0	18	10	1	10
Common Goldeneye	0	0	6	398	20	1	0	4	0	0	3	0	321	82	3	36
Hooded Merganser	0	0	1	0	0	0	0	7	1	0	x	0	14	5	0	0
Common Merganser	0	1	8	84	2	18	0	117	0	0	366	8	141	2408	71	266
Red-breasted Merganser	0	0	0	29	0	0	0	0	0	0	1	0	0	3016	0	5
Bald Eagle	0	2	4	3	0	1	1	13	1	0	x	4	6	9	1	4
Northern Harrier	0	10	0	2	6	x	x	2	2	1	2	1	0	2	2	5
Sharp-shinned Hawk	0	0	0	5	0	2	3	1	0	0	3	2	3	x	0	2
Cooper's Hawk	1	0	0	x	1	1	0	1	2	0	7	4	8	9	2	2
Red-tailed Hawk	2	6	x	4	7	12	8	4	33	19	51	83	93	29	12	6
Rough-legged Hawk	3	8	2	7	6	0	2	2	0	0	5	63	1	4	3	1
American Kestrel	2	9	0	5	4	5	1	10	50	17	46	13	54	31	13	17
Ring-necked Pheasant	2	5	1	1	6	11	3	18	0	0	0	2	2	1	0	0
Ruffed Grouse	8	8	3	20	5	4	7	7	1	0	0	1	0	0	0	2
Wild Turkey	0	59	x	25	65	45	118	45	0	0	0	103	0	3	83	94
American Coot	0	0	0	344	0	0	0	311	0	0	0	0	25	134	0	0
Common Snipe	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
Ring-billed Gull	0	0	0	119	64	2	0	2	14	0	295	0	280	840	12	149
Herring Gull	0	27	32	209	89	70	0	17	0	0	1009	0	1445	756	153	89
Rock Dove	170	402	26	170	383	30	154	183	816	251	1163	495	2222	900	528	244
Mourning Dove	211	206	75	194	145	111	73	59	259	110	733	890	1282	596	43	86
Eastern Screech-Owl	0	0	0	x	0	0	1	0	0	1	1	0	1	1	x	6
Great Horned Owl	1	1	0	x	6	4	0	1	3	1	9	9	23	4	1	6
Barred Owl	0	0	0	1	0	2	0	2	1	0	0	0	1	0	1	1
Belted Kingfisher	0	2	0	0	0	0	2	1	1	0	1	0	3	1	0	1
Red-headed Woodpecker	0	0	0	4	2	6	0	9	0	0	0	0	1	1	1	0
Red-bellied Woodpecker	2	2	8	10	4	16	17	9	10	2	21	24	24	9	4	5
Downy Woodpecker	26	20	19	63	18	67	37	44	94	19	93	110	114	69	43	21

Hairy Woodpecker	14	14	16	52	11	31	20	28	22	6	35	25	31	10	3	14
Northern Flicker	0	0	0	0	0	2	0	0	1	1	0	1	5	2	0	10
Pileated Woodpecker	1	1	1	6	0	3	2	5	1	0	0	1	1	0	0	0
Northern Shrike	2	2	1	2	0	1	1	1	5	0	2	4	1	1	1	1
Blue Jay	51	56	50	60	34	83	81	64	62	11	77	173	139	74	29	29
American Crow	196	201	225	354	281	86	132	168	271	43	602	320	507	168	109	80
Common Raven	5	12	13	23	13	3	11	11	2	1	0	0	0	0	0	0
Horned Lark	0	0	0	0	0	x	28	0	30	153	4	63	0	4	12	4
Black-capped Chickadee	91	363	170	382	205	184	248	204	344	81	303	392	262	132	112	166
Tufted Titmouse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red-breasted Nuthatch	1	12	12	23	1	14	8	14	3	0	12	13	6	4	6	1
White-breasted Nuthatch	6	18	17	42	22	39	30	59	80	16	76	66	94	51	36	16
Brown Creeper	0	0	0	4	0	0	1	9	6	0	8	4	11	3	2	10
Golden-crowned Kinglet	5	0	8	4	0	0	1	3	2	0	4	16	11	24	2	2
American Robin	4	22	7	224	32	x	38	154	60	151	82	87	590	123	10	3
European Starling	258	293	90	765	496	43	5	228	2110	672	2422	1092	2305	1306	964	178
Cedar Waxwing	0	0	0	37	0	x	8	17	0	0	37	0	81	12	0	6
American Tree Sparrow	334	121	14	22	65	6	156	28	181	108	140	2463	73	332	307	66
Song Sparrow	0	0	0	0	0	0	0	0	0	0	8	2	3	1	0	0
Swamp Sparrow	0	0	0	0	0	0	0	0	0	0	0	1	1	x	0	1
White-throated Sparrow	0	0	7	0	0	5	1	0	1	0	1	0	6	1	0	0
Dark-eyed Junco	137	113	112	255	180	124	515	149	350	122	314	1530	412	356	162	154
Lapland Longspur	0	42	0	0	0	0	0	0	0	250	0	0	0	20	100	0
Snow Bunting	98	835	6	x	0	21	150	4	30	11	150	130	136	1	44	265
Northern Cardinal	35	1	45	82	41	51	30	43	39	10	129	140	124	63	36	16
Red-winged Blackbird	0	0	0	0	0	x	0	0	0	0	3	3	0	1	0	0
Common Grackle	0	0	0	x	0	x	0	6	0	0	3	0	3	1	0	6
Purple Finch	63	29	35	28	5	32	128	25	20	0	13	9	10	3	2	5
House Finch	10	34	30	155	16	104	103	134	118	17	405	177	411	312	6	49
Common Redpoll	12	0	0	16	0	x	2	6	0	0	6	0	1	0	0	0
Pine Siskin	127	2	22	73	0	27	66	33	0	0	0	2	7	1	0	0
American Goldfinch	228	106	86	204	79	249	175	119	134	23	227	287	215	141	46	39
Evening Grosbeak	0	15	0	4	0	x	14	4	0	0	0	0	0	0	0	0
House Sparrow	181	374	73	204	158	359	42	237	951	631	1568	1511	1470	1353	1988	229
Total Species	**34**	**43**	**41**	**59**	**39**	**49**	**49**	**65**	**41**	**28**	**61**	**47**	**72**	**74**	**42**	**54**

x = Found within 3 days of the count day but not on the day of the count.

Table 5. Number of each species found on 15 or more counts in west and southwest Wisconsin.

Species	New Richmond 49	Hudson 50	Spring Valley 51	Durand 52	Nelson 53	Black River Falls 54	Trempealeau 55	LaCrosse 56	Kickapoo Valley 57	Richland Center 58	Cassville 59	Platteville 60	Baraboo 61	Sauk City 62	Mount Horeb 63	Blanchardville 64
Great Blue Heron	0	0	0	0	0	0	2	1	0	1	0	1	1	1	0	1
Canada Goose	1032	1949	21	26	0	90	1	326	2	90	74	31	1036	563	10	0
Mute Swan	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gadwall	0	21	15	0	0	0	0	211	0	0	0	0	0	10	0	0
American Black Duck	3	2	0	0	0	0	0	2	0	0	0	0	8	7	0	1
Mallard	788	330	55	0	116	3	10	1427	2	60	29	579	566	869	20	47
Lesser Scaup	0	0	0	0	0	0	0	189	0	0	1	0	0	0	0	0
Bufflehead	0	0	0	0	0	0	0	18	0	0	0	5	0	1	0	1
Common Goldeneye	46	54	0	0	9	0	0	1026	0	0	0	13	9	115	0	0
Hooded Merganser	1	0	0	0	0	0	0	1	0	0	0	0	x	0	0	0
Common Merganser	19	199	0	1	50	0	0	23	0	10	4	0	18	274	0	1
Red-breasted Merganser	0	0	0	0	0	0	0	7	0	0	0	0	0	7	0	0
Bald Eagle	7	29	6	11	10	1	1	68	x	17	102	3	27	30	0	6
Northern Harrier	0	0	1	4	0	0	0	0	4	12	5	0	4	8	17	15
Sharp-shinned Hawk	0	0	0	0	0	1	1	1	0	3	1	0	1	3	0	3
Cooper's Hawk	0	0	0	0	0	0	1	2	1	4	1	0	4	4	1	0
Red-tailed Hawk	2	10	20	10	29	4	19	38	37	99	53	16	45	99	101	91
Rough-legged Hawk	1	2	x	9	6	5	2	1	5	23	7	1	25	19	7	8
American Kestrel	2	0	3	2	0	1	8	9	3	31	8	3	3	19	19	17
Ring-necked Pheasant	4	7	2	0	0	0	1	1	0	3	0	2	1	2	4	0
Ruffed Grouse	1	1	1	3	6	0	1	1	4	6	0	3	1	3	1	1
Wild Turkey	0	50	117	71	322	47	46	193	189	861	18	134	179	359	95	55
American Coot	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Common Snipe	0	0	0	0	2	0	0	3	2	1	1	0	7	2	1	1
Ring-billed Gull	18	1	0	13	20	0	0	1149	0	34	2	74	0	19	0	3
Herring Gull	5	1	0	0	0	0	0	31	0	1	0	0	0	51	0	0
Rock Dove	70	89	115	259	135	55	15	201	394	970	120	48	127	727	348	163
Mourning Dove	0	4	45	1	47	37	252	108	31	149	153	20	167	281	84	39
Eastern Screech-Owl	0	0	0	0	0	0	0	3	0	1	3	0	4	1	0	2
Great Horned Owl	0	1	0	2	1	0	4	6	3	8	0	2	2	9	5	6
Barred Owl	0	0	0	0	0	1	2	7	x	0	3	1	1	2	3	0
Belted Kingfisher	0	2	4	0	1	0	2	3	0	9	1	5	3	5	1	5
Red-headed Woodpecker	0	0	1	0	0	1	1	1	6	3	4	1	1	0	8	1
Red-bellied Woodpecker	1	9	8	8	23	11	27	37	19	64	62	5	29	76	44	33
Downy Woodpecker	10	52	12	13	42	23	76	80	38	139	46	14	68	116	109	75

Hairy Woodpecker	7	12	7	7	6	16	20	29	10	28	18	1	11	36	23	17
Northern Flicker	0	x	0	0	0	1	5	5	0	5	11	2	4	7	2	0
Pileated Woodpecker	1	2	3	1	2	0	3	8	3	10	6	0	4	14	7	2
Northern Shrike	4	4	2	0	1	0	1	1	1	3	1	0	2	2	1	0
Blue Jay	36	6	36	32	97	64	130	115	80	375	53	58	84	329	151	77
American Crow	202	410	195	259	130	66	142	414	153	1304	140	107	889	785	519	439
Common Raven	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Horned Lark	0	0	160	0	159	0	15	0	47	1	0	0	58	8	3	25
Black-capped Chickadee	133	237	73	57	252	114	212	264	146	662	114	93	326	604	407	335
Tufted Titmouse	0	0	0	0	0	1	2	8	2	8	20	6	6	25	15	2
Red-breasted Nuthatch	0	0	0	0	0	1	5	4	2	1	0	2	0	2	0	1
White-breasted Nuthatch	7	42	18	24	40	27	38	86	31	130	75	13	57	108	99	104
Brown Creeper	1	0	0	1	0	1	3	19	0	6	10	0	1	3	3	5
Golden-crowned Kinglet	0	0	x	6	1	3	1	0	7	0	10	0	6	3	3	7
American Robin	130	484	8	238	90	9	61	708	4	60	8	2	62	200	8	157
European Starling	313	29	70	0	188	72	275	628	515	801	545	320	82	1731	951	765
Cedar Waxwing	0	110	0	0	15	0	0	13	4	6	8	34	31	93	0	15
American Tree Sparrow	11	59	103	20	286	0	519	326	365	259	151	12	460	643	100	441
Song Sparrow	0	0	0	0	0	0	0	4	0	2	15	0	1	1	0	9
Swamp Sparrow	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	2
White-throated Sparrow	0	0	0	0	0	1	0	0	0	0	0	0	1	2	0	2
Dark-eyed Junco	106	195	144	217	1313	444	920	437	465	1008	282	151	796	1215	412	512
Lapland Longspur	0	0	10	0	0	0	0	0	120	0	0	0	25	0	0	0
Snow Bunting	0	9	0	0	0	0	6	0	10	0	40	0	2	0	0	0
Northern Cardinal	26	55	38	4	146	35	218	127	80	343	108	24	123	286	153	144
Red-winged Blackbird	0	0	0	0	0	0	2	0	0	1	0	0	20	0	0	25
Common Grackle	0	0	0	0	0	0	2	0	0	0	x	12	0	0	1	3
Purple Finch	1	13	2	0	65	28	18	8	72	30	2	14	38	62	8	0
House Finch	29	11	20	5	41	23	111	94	9	134	169	22	133	244	60	19
Common Redpoll	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0
Pine Siskin	1	0	8	0	4	0	1	7	2	0	x	0	0	2	0	0
American Goldfinch	12	60	56	42	135	190	167	154	313	455	122	15	168	340	153	79
Evening Grosbeak	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
House Sparrow	101	138	240	163	612	8	315	308	603	1240	555	228	274	748	370	779
Total Species	**35**	**44**	**35**	**31**	**36**	**34**	**49**	**65**	**43**	**53**	**52**	**45**	**58**	**68**	**44**	**54**

x = Found within 3 days of the count day but not on the day of the count.

Table 6. Number of each species found on 15 or more counts in south-central Wisconsin.

Species	Wau-toma 65	Mon-tello 66	Green Lake 67	Pardee-ville 68	Ran-dolph 69	Horicon Marsh 70	Poy-nette 71	Hart-ford 72	Ocono-mowoc 73	Madi-son 74	Cooks-ville 75	Fort Atkin-son 76	Wau-kesha 77	Beloit 78	Milton 79	Lake Geneva 80
Great Blue Heron	0	0	0	0	0	6	0	0	2	3	x	0	1	x	0	1
Canada Goose	39	2746	100000	220	1615	175000	3102	2566	2447	4374	751	40	2248	1490	397	4922
Mute Swan	0	8	0	0	0	0	1	12	2	4	0	0	36	0	0	2
Gadwall	0	222	0	0	0	5	9	71	50	865	13	x	58	0	0	261
American Black Duck	10	19	9	0	2	263	1	22	7	24	26	0	0	1	0	3
Mallard	265	533	346	0	16	10036	237	144	856	3585	1075	121	180	280	124	11941
Lesser Scaup	0	x	1	0	0	0	0	0	2	35	0	0	0	0	0	615
Bufflehead	0	1	0	0	0	2	0	x	13	360	0	0	0	0	0	360
Common Goldeneye	0	16	71	0	0	0	1	1	89	284	5	0	1	203	11	375
Hooded Merganser	0	7	1	0	0	0	0	0	3	90	0	0	0	0	0	44
Common Merganser	0	3	113	0	0	0	46	x	31	3	14	0	0	0	0	11
Red-breasted Merganser	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0
Bald Eagle	3	12	5	0	0	2	0	x	2	2	1	x	0	0	0	3
Northern Harrier	0	12	1	5	x	22	4	1	1	0	0	2	1	2	0	7
Sharp-shinned Hawk	4	1	1	0	0	2	1	4	0	10	0	0	1	2	0	1
Cooper's Hawk	0	1	1	0	1	x	0	3	1	21	2	0	1	1	1	5
Red-tailed Hawk	23	24	34	10	1	39	7	26	31	132	20	27	17	26	18	42
Rough-legged Hawk	9	17	41	7	0	15	2	x	1	2	0	1	0	0	0	0
American Kestrel	0	6	2	0	0	22	2	3	10	14	6	8	5	12	3	20
Ring-necked Pheasant	1	1	4	3	3	1	27	4	0	2	1	1	8	5	0	5
Ruffed Grouse	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Wild Turkey	216	357	54	141	0	0	95	187	18	29	17	25	30	16	8	90
American Coot	0	249	28	0	0	1	0	326	252	3211	0	0	132	3	0	6872
Common Snipe	0	1	0	0	0	0	0	5	0	0	0	0	0	0	0	0
Ring-billed Gull	0	35	0	0	0	738	0	5	614	2923	x	0	198	333	18	3602
Herring Gull	0	2	15	0	0	532	0	3	10	2812	0	25	23	15	0	157
Rock Dove	172	178	135	9	10	337	30	188	522	814	128	144	125	349	64	404
Mourning Dove	277	52	36	76	35	209	81	92	76	675	42	123	170	209	52	74
Eastern Screech-Owl	0	1	0	0	0	0	0	4	4	101	10	0	2	2	0	2
Great Horned Owl	4	2	2	0	0	4	0	3	8	20	1	0	11	4	2	9
Barred Owl	1	2	1	0	0	1	2	1	0	1	0	0	0	x	0	1
Belted Kingfisher	0	2	0	2	0	1	0	1	1	4	1	4	2	0	0	1
Red-headed Woodpecker	8	5	0	3	0	0	2	0	0	0	1	2	0	1	0	4
Red-bellied Woodpecker	29	18	8	5	1	4	33	14	15	113	2	15	11	12	4	25
Downy Woodpecker	81	55	28	8	5	32	79	64	49	298	38	104	52	54	6	84

Hairy Woodpecker	38	14	9	x	3	10	21	13	8	84	6	7	12	6	5	11
Northern Flicker	3	4	1	0	0	0	0	1	0	16	0	0	5	1	0	1
Pileated Woodpecker	7	3	x	1	0	0	0	0	0	0	0	0	0	0	0	0
Northern Shrike	3	4	1	0	0	4	0	0	3	5	0	0	2	2	0	1
Blue Jay	383	197	27	17	6	15	128	32	55	208	52	25	30	57	9	98
American Crow	981	439	358	101	12	99	220	443	337	1940	235	127	400	622	78	524
Common Raven	0	3	x	0	0	0	0	0	0	0	0	0	0	0	0	0
Horned Lark	x	6	140	0	98	0	333	151	15	15	156	30	0	0	31	82
Black-capped Chickadee	391	331	74	31	5	82	340	391	140	1193	106	253	275	138	13	218
Tufted Titmouse	0	2	0	0	0	1	33	0	4	9	2	0	0	7	5	5
Red-breasted Nuthatch	16	2	2	1	0	0	9	8	1	26	2	14	9	5	6	7
White-breasted Nuthatch	114	87	28	16	2	19	92	41	36	268	14	50	38	32	5	75
Brown Creeper	4	1	1	x	0	0	3	4	0	68	2	5	0	9	0	3
Golden-crowned Kinglet	0	x	0	0	0	4	5	10	0	82	0	0	4	1	0	9
American Robin	217	62	83	0	0	x	x	53	171	689	1	84	457	45	23	82
European Starling	316	497	13	19	28	1606	53	465	436	2634	253	5415	833	1434	83	1092
Cedar Waxwing	12	126	0	0	0	0	0	8	57	316	0	0	37	4	0	0
American Tree Sparrow	239	272	430	294	60	339	516	191	128	925	582	161	160	843	123	389
Song Sparrow	0	1	0	0	0	2	13	1	2	35	1	0	0	3	0	2
Swamp Sparrow	0	0	0	0	0	0	0	1	0	14	0	0	1	0	0	0
White-throated Sparrow	0	0	0	0	0	0	0	x	0	36	2	2	0	0	0	1
Dark-eyed Junco	2105	1032	370	537	78	104	1827	417	270	1759	293	223	298	788	23	485
Lapland Longspur	0	8	0	0	58	0	606	0	0	0	0	x	0	300	0	300
Snow Bunting	0	0	40	0	154	115	35	102	38	105	60	0	0	185	0	0
Northern Cardinal	174	65	40	39	8	7	169	95	110	603	47	74	78	94	9	158
Red-winged Blackbird	0	1	1	144	0	352	2	0	0	228	0	0	14	0	0	1
Common Grackle	0	0	0	16	0	33	1	0	0	2	0	0	1	0	0	3
Purple Finch	70	41	42	10	30	0	71	0	8	40	0	2	0	3	0	0
House Finch	70	41	7	33	23	24	214	178	54	819	35	210	27	152	20	201
Common Redpoll	0	1	0	0	2	0	2	0	0	6	0	2	0	0	0	0
Pine Siskin	2	6	1	0	0	0	19	4	0	6	0	0	0	0	0	0
American Goldfinch	303	275	87	49	74	101	321	152	72	658	51	77	74	48	16	492
Evening Grosbeak	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
House Sparrow	95	65	14	15	155	416	432	728	315	2158	188	104	191	466	40	510
Total Species	**40**	**74**	**51**	**30**	**29**	**54**	**47**	**52**	**50**	**92**	**41**	**39**	**48**	**47**	**31**	**69**

x = Found within 3 days of the count day but not on the day of the count.

Table 7. Number of each species found on 15 or more counts in southeast Wisconsin, and species totals and percent change for all counts.

Species	Woodland Dunes NW 81	Woodland Dunes NE 82	Woodland Dunes SW 83	Woodland Dunes SE 84	Plymouth 85	Sheboygan 86	Kettle Moraine 87	Riveredge 88	Milwaukee 89	Hales Corners 90	Burlington 91	Kenosha 92	Number of Counts	No. of Individuals	Percent Change
Great Blue Heron	1	0	0	0	0	0	0	0	1	0	1	x	15	24	−1
Canada Goose	55	132	467	869	1213	15	103	10545	4927	3131	147	100	67	360,774	+86
Mute Swan	0	0	1	4	1	0	0	1	0	0	15	0	16	105	+123
Gadwall	0	0	0	0	0	0	0	4	18	0	6	0	22	1,932	+488
American Black Duck	4	1	0	26	17	9	0	46	57	2	3	x	42	1,521	+20
Mallard	4	132	11	238	304	145	1	1017	1969	608	501	165	71	50,327	+74
Lesser Scaup	0	0	0	1	1	8	0	11	187	0	0	0	18	1,154	+672
Bufflehead	0	0	0	29	0	92	0	37	739	17	31	9	25	2,194	+231
Common Goldeneye	0	8	0	493	x	86	0	92	917	1	6	7	46	5,192	−20
Hooded Merganser	0	1	0	0	0	0	0	0	12	0	25	0	18	217	+310
Common Merganser	0	18	3	3	x	11	0	20	18	0	3	4	45	4,627	−1
Red-breasted Merganser	0	0	3	52	0	1	0	51	324	0	0	7	15	3,518	+1102
Bald Eagle	0	0	0	0	0	0	0	0	x	0	0	0	61	527	0
Northern Harrier	0	2	2	2	2	x	7	6	1	0	1	0	46	200	+182
Sharp-shinned Hawk	1	1	0	2	3	0	3	9	3	1	0	1	44	95	27
Cooper's Hawk	0	2	0	0	3	2	4	4	8	2	2	x	43	129	+59
Red-tailed Hawk	2	10	9	2	18	x	48	92	22	18	4	3	75	1,926	+16
Rough-legged Hawk	1	2	2	0	5	0	3	2	1	0	0	0	64	425	−6
American Kestrel	2	3	20	2	17	x	8	51	12	8	5	x	62	661	+5
Ring-necked Pheasant	1	0	1	1	2	0	6	6	1	0	2	18	54	208	−21
Ruffed Grouse	0	0	1	0	0	0	3	2	0	0	0	0	58	463	+38
Wild Turkey	30	18	115	32	54	0	67	111	0	0	0	x	59	6,540	+178
American Coot	0	0	0	8	28	1	0	25	242	65	203	118	23	12,580	+589
Common Snipe	0	0	0	0	0	0	0	1	2	0	0	0	15	31	+7
Ring-billed Gull	12	0	4	3221	243	18	0	280	2331	856	5	400	45	19,033	+291
Herring Gull	54	61	1	229	135	143	0	108	1730	91	74	380	44	10,904	−6
Rock Dove	19	21	299	139	287	x	481	784	664	92	30	168	84	22,063	−10
Mourning Dove	7	58	24	68	77	47	77	504	308	84	50	18	86	11,757	−12
Eastern Screech-Owl	0	0	0	0	0	0	0	24	4	0	0	1	25	183	−3
Great Horned Owl	1	1	1	0	2	x	4	31	10	8	4	x	61	281	−12
Barred Owl	0	0	1	0	2	0	x	4	0	0	0	0	33	59	−22
Belted Kingfisher	0	0	0	0	0	0	1	2	2	0	3	1	38	84	+22
Red-headed Woodpecker	0	0	0	0	0	0	0	3	0	0	0	0	32	88	−34

Red-bellied Woodpecker	1	3	5	1	16	0	21	60	17	3	1	2	75	1,220	+15
Downy Woodpecker	10	14	25	20	51	2	112	299	106	90	3	2	92	4,424	+36
Hairy Woodpecker	7	7	11	7	16	0	29	83	24	8	2	x	89	1,481	+6
Northern Flicker	0	0	0	0	1	0	3	9	1	x	0	x	32	115	−4
Pileated Woodpecker	0	2	1	0	1	0	1	0	0	0	0	0	53	165	−11
Northern Shrike	0	0	0	1	1	x	3	4	1	1	0	0	60	143	−21
Blue Jay	22	29	36	28	74	2	132	203	35	6	8	2	92	6,558	−35
American Crow	30	36	267	143	338	26	345	1075	1304	160	62	150	92	26,093	+12
Common Raven	0	0	0	0	0	0	0	0	0	0	0	0	38	691	+9
Horned Lark	5	49	0	0	0	0	31	1	0	0	0	1	42	2,337	+69
Black-capped Chickadee	92	57	72	168	129	26	365	1223	579	153	33	11	92	22,682	+6
Tufted Titmouse	0	0	0	0	0	0	0	0	0	1	0	0	22	195	+10
Red-breasted Nuthatch	0	1	0	0	4	0	12	42	2	2	1	x	75	867	−29
White-breasted Nuthatch	8	7	14	19	23	1	59	236	73	80	2	2	92	3,988	+4
Brown Creeper	2	0	2	0	0	0	10	13	3	1	0	x	53	276	+9
Golden-crowned Kinglet	3	0	0	2	1	0	10	22	13	4	4	0	49	338	+61
American Robin	4	3	0	125	76	59	174	174	853	84	9	3	71	7,751	+930
European Starling	132	22	225	119	537	40	598	2019	1336	225	126	200	88	45,472	−4
Cedar Waxwing	0	0	0	0	13	x	4	125	214	12	0	2	38	1,729	−12
American Tree Sparrow	32	90	45	61	29	12	804	290	55	23	16	5	84	19,292	+39
Song Sparrow	1	0	0	0	0	0	1	4	6	0	1	1	26	121	−47
Swamp Sparrow	1	0	0	1	0	0	1	2	0	0	1	3	15	38	−24
White-throated Sparrow	0	0	0	0	0	x	0	4	2	0	0	0	20	78	−35
Dark-eyed Junco	110	136	83	113	177	60	1167	1391	438	126	40	19	88	32,069	+71
Lapland Longspur	0	0	0	0	0	0	200	0	0	0	1	0	20	2,274	+345
Snow Bunting	5	0	0	34	0	0	6	0	2	0	0	1	54	5,031	−36
Northern Cardinal	13	31	10	35	36	13	200	334	245	82	9	5	83	6,282	+13
Red-winged Blackbird	0	0	0	0	0	0	0	32	0	0	0	1	19	837	−43
Common Grackle	0	0	0	0	0	0	0	0	0	0	0	0	21	118	−43
Purple Finch	3	1	0	0	3	0	38	43	0	0	0	x	72	2,689	+89
House Finch	9	20	214	219	55	40	37	516	419	69	10	2	78	7,328	+77
Common Redpoll	0	0	0	0	0	0	0	0	0	0	0	0	21	233	−91
Pine Siskin	10	21	21	0	0	0	18	6	0	4	0	0	47	1,269	−59
American Goldfinch	75	48	70	46	142	35	155	439	318	58	18	13	91	14,430	+19
Evening Grosbeak	0	0	0	0	0	0	0	0	0	0	0	0	20	1,215	−60
House Sparrow	111	58	247	217	325	75	859	1378	1415	173	63	200	81	35,907	−30
Total Species	**39**	**41**	**38**	**41**	**43**	**30**	**46**	**73**	**72**	**39**	**48**	**49**			

x = Found within 3 days of the count day but not on the day of the count.

Table 8. Species found on 14 or fewer counts.

Species	Number of Counts	Number of Birds	Count and Number
Common Loon	7	18	(Ashland), Sturgeon Bay 1, Blanchardville 1, Montello 1, Madison 11, Lake Geneva 2, Riveredge 1, Burlington 1
Pied-billed Grebe	11	30	(Ashland), (Wisconsin Rapids), New Franken 7, Fremont 1, Oshkosh 1, Sauk City 1, Montello 1, Oconomowoc 6, Madison 3, Lake Geneva 3, Milwaukee 2, Burlington 4, Kenosha 1
Horned Grebe	3	3	Green Bay 1, Madison 1, Milwaukee 1, (Kenosha)
Western Grebe	1	1	Gurney 1
Double-crested Cormorant	8	42	Wisconsin Rapids 1, Green Bay 20, Appleton 5, Oshkosh 10, LaCrosse 1, Woodland Dunes SW 1, Riveredge 2, Milwaukee 2, (Kenosha)
Greater White-fronted Goose	1	1	Appleton 1
Snow Goose	11	344	Ashland 1, Green Bay 2, Appleton 2, Bridgeport 2, Montello 1, Horicon Marsh 28, Madison 2, Waukesha 1, Lake Geneva 300, Riveredge 4, Racine 1
Trumpeter Swan	6	47	(Ashland), Grantsburg 3, (Luck), Merrill 2, Wausau 3, Hudson 30, Horicon 5, Fort Atkinson 4, (Sheboygan)
Tundra Swan	11	1,078	Bayfield 11, Ashland 22, Peshtigo 45, (Oshkosh), Trempealeau 8, LaCrosse 640, Bridgeport 50, Platteville 142, Mount Horeb 58, (Montello), Horicon Marsh 76, (Hartford), Madison 7, LaCrosse 19, (Plymouth)
Wood Duck	11	17	Appleton 1, Oshkosh 1, Sauk City 1, Blanchardville 2, Randolph 1, Madison 2, Fort Atkinson 2, Woodland Dunes SW 3, Riveredge 1, Hales Corners 1, Kenosha 2
American Wigeon	14	591	(Stevens Point), Sturgeon Bay 24, (Shawano), Appleton 6, Oshkosh 50, LaCrosse 2, Bridgeport 4, Montello 193, Green Lake 4, Horicon Marsh 1, Poynette 1, Madison 120, Cooksville 1, Lake Geneva 183, Riveredge 1, Milwaukee 1
Blue-winged Teal	1	1	Cassville 1
Northern Shoveler	11	901	Shawano 2, Appleton 43, Oshkosh 12, Fond du Lac 132, LaCrosse 150, Bridgeport 12, Montello 5, Horicon Marsh 189, Madison 350, Lake Geneva 4, Burlington 2
Northern Pintail	8	94	(Stevens Point), (Appleton), Oshkosh 2, LaCrosse 40, Sauk City 1, Montello 2, Horicon Marsh 31, Lake Geneva 5, Sheboygan 1, Riveredge 12
Green-winged Teal	11	83	Ashland 4, Chippewa Falls 1, Oshkosh 2, Fond du Lac 1, Bridgeport 1, Platteville 1, Montello 24, Horicon Marsh 20, Madison 25, Milwaukee 3, Burlington 1
Canvasback	11	6,662	Sturgeon Bay 1, New Franken 1, Shawano 2, Appleton 1, Oshkosh 3, LaCrosse 2,592, Bridgeport 4,032, Horicon Marsh 7, Madison 11, Lake Geneva 11, (Sheboygan), Milwaukee 1, (Kenosha)
Redhead	10	127	Chippewa Falls 1, Wausau 1, Sturgeon Bay 40, Green Bay 1, LaCrosse 14, Horicon Marsh 3, Hartford 2, Madison 14, Woodland Dunes SW 3, (Sheboygan), Milwaukee 48, (Kenosha)

Ring-necked Duck	10	160	Wausau 1, Shawano 2, Appleton 1, Oshkosh 2, Hudson 4, Montello 1, Horicon Marsh 3, Madison 9, Lake Geneva 135, Riveredge 2
Greater Scaup	8	7,365	Sturgeon Bay 36, Appleton 5, Oshkosh 6, Hartford 2, Woodland Dunes SE 9, (Sheboygan), Riveredge 82, Milwaukee 7,094, (Hales Corners), Racine 131, (Kenosha)
Harlequin Duck	2	5	Sheboygan 1, Milwaukee 4
White-winged Scoter	1	1	Milwaukee 1
Oldsquaw	7	60	(Ashland), Ephraim 9, Sturgeon Bay 3, Woodland Dunes SE 1, Riveredge 32, Milwaukee 6, Racine 5, Kenosha 4
Barrow's Goldeneye	1	1	Milwaukee 1
Ruddy Duck	11	60	Adams 2, Appleton 1, Oshkosh 2, Fond du Lac 18, (Baraboo), Sauk City 6, Montello 3, Poynette 3, Hartford 1, Madison 10, (Sheboygan), Milwaukee 8, Burlington 6
Northern Goshawk	10	15	Gurney 1, Grantsburg 1, (Sturgeon Bay), Brussels 2, New Franken 5, (Caroline), Platteville 1, Pardeeville 1, Hartford 1, Madison 1, Lake Geneva 1, Riveredge 1
Red-shouldered Hawk	6	8	Waupaca 1, Hudson 1, Bridgeport 1, Sauk City 2, Montello 2, Madison 1,
Golden Eagle	9	12	Clam Lake 1, Grantsburg 1, Warrens 2, Hudson 2, Kickapoo Valley 1, Bridgeport 2, Cassville 1, Platteville 1, Milton 1
Merlin	5	7	Wausau 1, (Shawano), Green Bay 1, Madison 3, Waukesha 1, Lake Geneva 1
Peregrine Falcon	4	4	Green Bay 1, Appleton 1, Sauk City 1, Milwaukee 1
Gray Partridge	3	17	New Franken 6, (Green Bay), Woodland Dunes NE 7, Kenosha 4
Spruce Grouse	1	2	Three Lakes 2
Sharp-tailed Grouse	1	13	Grantsburg 13, (Warrens)
Greater Prairie-Chicken	1	127	(Arpin), Plainfield 127
Northern Bobwhite	2	2	Wautoma 1, Montello 1
Virginia Rail	1	1	Kenosha 1
Sandhill Crane	7	6,019	(Wausau), Green Bay 2, (Appleton), Richland Center 2, Baraboo 8, Madison 37, (Beloit), Lake Geneva 5,960, Racine 1, Kenosha 9
Killdeer	8	12	Green Bay 2, Baraboo 1, Sauk City 1, Madison 2, Beloit 3, Lake Geneva 1, (Riveredge), Racine 1, Kenosha 1
Bonaparte's Gull	2	5	Ashland 1, Kenosha 4
Thayer's Gull	2	2	(Green Bay), Appleton 1, Riveredge 1
Lesser Black-backed Gull	2	2	(Green Bay), Madison 1, Milwaukee 1
Glaucous Gull	6	7	Green Bay 2, Appleton 1, Oshkosh 1, Madison 1, Sheboygan 1, Riveredge 1
Great Black-backed Gull	1	1	(Sheboygan), Racine 1

(continued)

Table 8. (Continued)

Species	Number of Counts	Number of Birds	Count and Number
Snowy Owl	1	1	Ashland 1, (Madison)
Long-eared Owl	8	20	Fond du Lac 3, Nelson 3, Mount Horeb 1, Madison 1, Waukesha 6, Woodland Dunes NE 1, Riveredge 4, Milwaukee 1, (Kenosha)
Short-eared Owl	11	44	Medford 1, Wisconsin Rapids 6, Shawano 2, Appleton 6, Stockbridge 6, Bridgeport 6, Pardeeville 1, Horicon Marsh 6, (Poynette), Woodland Dunes NE 1, Milwaukee 3, Burlington 6
Northern Saw-whet Owl	3	3	(Cable), Green Bay 1, Madison 1, Waukesha 1
Yellow-breasted Sapsucker	9	14	Plainfield 1, (New Franken), Shawano 1, Oshkosh 1, Black River Falls 1, Baraboo 1, Sauk City 2, Montello 2, Green Lake 1, Kenosha 4
Black-backed Woodpecker	1	1	Fifield 1
Gray Jay	8	62	Cable 3, Clam Lake 4, Oxbo 20, Fifield 4, Manitowish Waters 10, Phelps 13, Three Lakes 3, Rhinelander 5
Barn Swallow	1	1	Kenosha 1
Boreal Chickadee	3	16	Clam Lake 2, Three Lakes 4, Ephraim 10
Carolina Wren	11	16	Rhinelander 1, Lakewood 1, Merrill 1, Norske 1, Oshkosh 1, Black River Falls 1, Bridgeport 2, Cassville 1, Madison 5, Riveredge 1, Milwaukee 1
Winter Wren	4	4	Appleton 1, Cassville 1, Madison 1, Woodland Dunes NW 1
Sedge Wren	1	1	Madison 1
Ruby-crowned Kinglet	1	1	Bridgeport 1
Eastern Bluebird	11	45	Trempealeau 2, LaCrosse 7, Kickapoo Valley 1, Richland Center 10, Bridgeport 3, Cassville 4, Baraboo 1, Sauk City 10, Mount Horeb 2, Blanchardville 2, Milwaukee 3
Hermit Thrush	3	4	Caroline 1, Madison 1, (Waukesha), Milwaukee 2
Wood Thrush	1	1	Madison 1
Varied Thrush	2	2	(Manitowish Waters), Ephraim 1, New Franken 1, (Shawano), (Hartford)
Brown Thrasher	5	5	Phelps 1, Sturgeon Bay 1, Green Bay 1, Woodland Dunes NE 1, Riveredge 1
Bohemian Waxwing	12	618	Bayfield 120, Fifield 200, Three Lakes 2, Grantsburg 70, Holcombe 25, Gilman 14, Medford 116, Chippewa Falls 47, Spencer 17, (Norske), Caroline 2, Green Bay 4, Appleton 1
Yellow-rumped Warbler	7	23	Sturgeon Bay 1, Oshkosh 2, Richland Center 1, (Madison), Milwaukee 15, Hales Corners 2, Racine 1, Kenosha 1
Eastern Towhee	3	3	Warrens 1, Bridgeport 1, Madison 1
Field Sparrow	4	10	Stevens Point 1, Bridgeport 6, Platteville 2, Blanchardville 1
Fox Sparrow	8	10	Fifield 2, Sturgeon Bay 2, Bridgeport 1, Sauk City 1, Green Lake 1, Beloit 1, Sheboygan 1, Kenosha 1
Harris's Sparrow	3	3	Bayfield 1, Baraboo 1, Madison 1

White-crowned Sparrow	2	2	Bridgeport 1, Madison 1
meadowlark spp.	2	3	Plainfield 2, Caroline 1
Rusty Blackbird	9	115	Peshtigo 1, Trempealeau 1, LaCrosse 1, Bridgeport 3, Blanchardville 90, Wautoma 1, Montello 2, Hartford 1, Fort Atkinson 15
Brewer's Blackbird	1	1	Fort Atkinson 1
Brown-headed Cowbird	13	262	Spencer 2, Green Bay 95, Fremont 4, Oshkosh 2, Bridgeport 1, Cassville 1, Blanchardville 32, Montello 31, Green Lake 1, Horicon Marsh 73, Madison 3, Plymouth 2, Kettle Moraine 15, (Kenosha)
Baltimore Oriole	1	1	Ephraim 1
Pine Grosbeak	13	95	Herbster 1, Bayfield 28, Oxbo 24, Fifield 4, Manitowish Waters 3, Luck 2, Holcombe 1, Peshtigo 11, Sturgeon Bay 2, New Franken 13, Caroline 1, Shawano 3, Randolph 2
Red Crossbill	6	38	Oxbo 4, Phelps 4, Wausau 2, Shawano 7, LaCrosse 4, Kettle Moraine 17
White-winged Crossbill	4	13	(Cable), Clam Lake 4, Fifield 5, Gilman 3, Durand 1

Parentheses indicate species was seen within 3 days of the count but not on the day of the count.

record), and the 20 Long-eared Owls made for the highest total since 1989. The 183 Eastern Screech-Owls and 3 Saw-whet Owls were about average, while numbers of Great Horned and Barred Owls were well below average. The only Snowy Owl was found at Ashland; this was the lowest total since 1972. A Great Gray Owl was seen at Herbster during the count period.

Kingfisher—The total of 84 Belted Kingfishers was 22% above average.

Woodpeckers—A record 4,424 Downy Woodpeckers were reported, which is 36% above average. Above average counts of Red-bellied and Hairy Woodpeckers and Yellow-bellied Sapsuckers were also reported. Northern Flickers occurred in about average numbers, but numbers of both Red-headed and Pileated Woodpeckers were about 33% below average. One Black-backed Woodpecker was found at Fifield.

Shrikes—Northern Shrike counts were 21% below average.

Jays, Crows, and Ravens—Counts of Gray and Blue Jays were well below average. A lack of unharvested corn probably influenced Blue Jay numbers. Numbers of American Crows and Common Ravens were somewhat above average.

Larks and Swallows—It was a good year for Horned Larks, the 2,337 being 59% above average. A Barn Swallow at Kenosha was a pleasant surprise.

Chickadees, Titmice, Nuthatches, and Creepers—The 16 Boreal Chickadees were well above average, while Black-capped Chickadees, Tufted Titmice, White-breasted Nuthatches, and Brown Creepers occurred in slightly above average numbers. The number of Red-breasted Nuthatches was 29% below average, with most of them being found in the north.

Wrens and Kinglets—A record number of Carolina Wrens (14 on 10 counts) was probably the result of recent mild winters. They occurred as far north as Rhinelander, Lakewood, and Merrill. Only 4 Winter Wrens were reported, which was below average. A Sedge Wren at Madison was a highlight. The total of 338 Golden-crowned Kinglets was 61% above average. The only documented Ruby-crowned Kinglet was found at Bridgeport.

Thrushes, Thrashers, etc.—The exceptional record of 7,751 American Robins (4.1 times previous record) will be remembered; they occurred for the first time on many counts. In most years they occur on about 44% of the counts, but in 1998 77% of the counts found robins. The total of 45 Eastern Bluebirds was the second highest total; 65 were found in 1989. A Wood Thrush at Madison was the first ever found on a Wisconsin Christmas count. Varied Thrushes at Ephraim and New Franken were other highlights. The 4 Hermit Thrushes were below average, while the 5 Brown Thrashers were slightly above average.

Starlings, Waxwings, Warblers, and Towhees—Starlings occurred in about average numbers. The total of 23 Yellow-rumped Warblers was second only to last year's 28. There was a good invasion of Bohemian Waxwings (618) into the northern half of the state; that number was 60% above average. Cedar

Waxwing numbers were 12% below average. Eastern Towhees were seen at Warrens, Bridgeport, and Madison.

Sparrows, etc.—Some sparrows were especially numerous, while others were quite scarce. Only Field and Fox Sparrows occurred in about average numbers. A record 32,069 Dark-eyed Juncos (71% above average) and 19,292 Tree Sparrows (39% above average) were unusually abundant statewide. The 2,274 Lapland Longspurs was the highest total since 1967 and was 345% above average. However, Song Sparrows (45% below average), Swamp Sparrows (24% below average), White-throated Sparrows (35% below average), and Snow Buntings (36% below average) were more difficult to find this year. White-crowned Sparrows were found only at Bridgeport and Madison, while a record 3 Harris's Sparrows were recorded, one each at Bayfield, Baraboo, and Madison. A Harris's Sparrow was last seen on Christmas counts in 1989.

Cardinals, Blackbirds, Meadowlarks, and Orioles—A bright spot was the second highest total of Northern Cardinals (6,282). The very low numbers of Red-winged Blackbirds and Common Grackles (both 43% below average) continued a trend that began in 1995. Also, only 3 meadowlarks and 1 Brewer's Blackbird were seen. On a positive note, the 115 Rusty Blackbirds was the highest total since 1981, and the 261 Brown-headed Cowbirds was 33% above average. A highlight was the Baltimore Oriole at Ephraim.

Finches, etc.—It was a poor year for most winter finches. Compared to the last 10 years, Pine Grosbeak numbers were down 87%, Common Redpolls were down 91%, Pine Siskins were down 59%, and Evening Grosbeaks were down 60%. In contrast, American Goldfinch numbers were up 19% and Purple Finch numbers were up 89%, with a record 2,689 having been counted, mostly in northern Wisconsin. The 38 Red Crossbills and 13 White-winged Crossbills were well below average. House Finch counts were slightly lower than in the last two years, possibly due to effects of their eye disease, which I noticed was quite prevalent last summer.

House Sparrow—Numbers continued to decline; this year's total was the lowest since I began keeping records in 1965. The decline began in 1990 when House Finches first became numerous in the state, and may be due to House Finch competition. Very cold winters have been known to adversely affect House Sparrows, but last winter (1997–98) was exceptionally warm.

Summary

The 1998 Wisconsin Christmas bird counts were exceptional, not only because of the large number of species that were found, but because of the extraordinary numbers of many species. Other rarities perhaps could have been added, but, unfortunately, documentation was not provided. Also, one count was not included and two others were only partially included because they were received well after the January 10 deadline. In order to complete the compilation in time to submit this report to the Editor in late January for publication in the spring issue of *The Passenger Pigeon,* it is important that reports and documentation are received

on time. It is also important that counts be submitted on the latest WSO report form, which uses the most recent checklist order and contains additional uncommon birds. Use of older forms complicates compilation and increases the chance for errors. Daryl Tessen and I will no longer call compilers to request documentation or tardy counts.

There is no charge for publication of counts in *The Passenger Pigeon,* only for those also published by the National Audubon Society. Submission of counts to National Audubon (on their report form), as well as to the Wisconsin Society for Ornithology is encouraged. Individuals participating in counts should submit reports and documentation to the count compiler for compilation and forwarding to Daryl Tessen. Documentation should be written at the time of observation or shortly thereafter. If you wish to participate in a count in 1999, please contact the compiler in your area. If you plan to initiate a new count in an area not presently covered (Figure 1), please write to me to avoid conflicts and overlapping of other counts, and to obtain a report form. Counts should emphasize field observation and not rely on feeder observers; a minimum of 8 hours of field observation is required.

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Errata: In Table 4 of the article on the 1997 Wisconsin Christmas bird counts (*The Passenger Pigeon,* Vol. 60, No. 1, 1998, p. 58), count number 29 in the column heading should read Spruce, not Spooner (which is number 6).

50 Years Ago in *The Passenger Pigeon*

Although I found the highlight of Volume 11, No. 1, 1949, to be the photograph of nine-year-old Daryl Tessen with a chickadee feeding from his hand, the issue contained much of interest. In addition to field notes, results of 13 Christmas bird counts, a write-up on Aldo Leopold's death, book reviews, Society news, a report by Sam Robbins on the over 1,900 nests of 129 species found by WSO members during the 1948 nesting season, and other assorted notes and articles, the 15-page lead article was on the American Egret in Wisconsin. The following is author Frank H. King's conclusion:

> This type of study illustrates the value of fitting together the small pieces of individual observation to make a general picture, and helps bring out many records not previously known. The increase of the egret shows that a species can sometimes be saved from the very edge of extinction, and the reappearance of these graceful white birds should be an especially gratifying sight to those who have worked long and hard for the protection of our native wild-life. If the extinct passenger pigeon is a symbol of the need for conservation, the living egret can be a symbol of the future hope for conservation.

The Summer Season: 1998

by Thomas K. Soulen

June began cool and mostly dry. High temperatures the first week were mostly in the 70s, and they barely reached the low 80s the following week. There were several nights of frost in northern and central counties both weeks, with some damage to crops. By mid-June high temperatures had climbed to about 90 in most areas. For the remainder of the season, there were days each week in most areas with temperatures in the 90s.

Rainfall was modest early in the season, and some northern areas were dry enough to cause farmers concern. By mid-June the situation began to change, although in a spotty fashion, and by the last third of the month many areas were deluged. Some central counties received 4–5 inches of rain in a week. Field work was hampered by high water and flooding of fields in some areas. There was no widespread storm damage, but some localized areas experienced crop loss due to wind. July precipitation amounts were generally low, with most areas receiving less than a half inch per week. Northern counties were especially dry the last third of July.

Observers made relatively few comments about the weather's impact on birds or birding. In some areas high water was thought to have hurt marsh nesters, and as always, shorebirding was affected in various ways, depending on whether high or low water was best for particular potential hot spots. Some commented that the hot and generally humid weather, coupled with high mosquito populations, made for less comfortable birding during parts of the summer.

Wisconsin observers recorded a total of 271 species during the season, the highest summer total ever. The account that follows gives details on 165 of them. An additional 77 that are not mentioned were common and widespread enough to be reported from more than 25 counties. The remaining 29 species, generally noted in 10–25 counties, are listed here along with the number of counties in which each was recorded: Double-crested Cormorant (25), American Bittern (20), Great Egret (14), Black-crowned Night-Heron (10), Northern Shoveler (13), Green-winged Teal (17), Redhead (11), Ring-necked Duck (13), Hooded

Merganser (24), Common Merganser (12), Ring-necked Pheasant (23), Virginia Rail (20), Sora (23), Upland Sandpiper (16), Common Snipe (22), American Woodcock (24), Herring Gull (22), Eastern Screech-Owl (10), Great Horned Owl (22), Whip-poor-will (18), Red-headed Woodpecker (25), Common Raven (25), Hermit Thrush (20), Golden-winged Warbler (21), Nashville Warbler (22), Pine Warbler (23), Brewer's Blackbird (25), Purple Finch (22), and Evening Grosbeak (12).

Headlining the list of summer rarities were Wisconsin's first records of the Eurasian Collared-Dove. One obligingly appeared near Noel Cutright's home in Ozaukee County, and a day before that individual was last seen, a second bird was spotted in the Buena Vista Marsh in Portage County. Both birds fortunately were seen and documented by a number of observers.

Another first summer season record for Wisconsin was provided by Marge Gibson's discovery of a Bohemian Waxwing in Langlade County in late July. Had a resident in the northern part of the county not known about Marge's rehabilitation center, she never would have delivered to Marge a "bigger Cedar Waxwing" that had hit her window.

Observers noted several other species for which there are very few summer records. A single Kirtland's Warbler spent the first half of June in the same Vilas County location where two had been last year; there were no other reports of this species. Other summer rarities included a Tricolored Heron in Brown County, two Swainson's Hawks in Sauk County, a successfully nesting pair of Piping Plovers in Ashland County, a Purple Sandpiper in Kewaunee, a Ruff in Milwaukee, a Philadelphia Vireo in Bayfield County in mid–July (in the same location where one was first observed last summer), an adult male Summer Tanager in Dane County, and several White-crowned Sparrows.

More frequently reported in summer but still rare enough to be of special interest were Red-necked, Eared, and Western Grebes; Snowy Egret; Yellow-crowned Night-Heron; Snow Goose; Spruce Grouse; Yellow and King Rails; American Avocet; Willet; Whimbrel; Hudsonian and Marbled Godwits; Western Sandpiper; Red-necked Phalarope; Thayer's, Iceland, Glaucous, and Great Black-backed Gulls; Black-backed Woodpecker; Western Kingbird; White-eyed Vireo; Carolina Wren; Northern Mockingbird (seven locations); Yellow-throated, Prairie, and Worm-eating Warblers; and Le Conte's Sparrow.

A few observers compared species abundance between this year and previous years, either via written comments or the codes on single county forms. The only species thought to be more common this year by at least three observers were Wild Turkey and Black-billed Cuckoo. In contrast, there were 26 species that at least three observers thought to be less common (or in some cases were absent) this year: Wood Duck, Hooded Merganser, Sora, Killdeer, Spotted Sandpiper, Black Tern, Common Nighthawk, Belted Kingfisher, Red-headed Woodpecker, Least Flycatcher, Warbling Vireo, Purple Martin, Tree and Bank Swallows, Brown Creeper, Sedge Wren, Brown Thrasher, Blue-winged and Black-and-white Warblers, American Redstart, Ovenbird, Vesper and Savannah Spar-

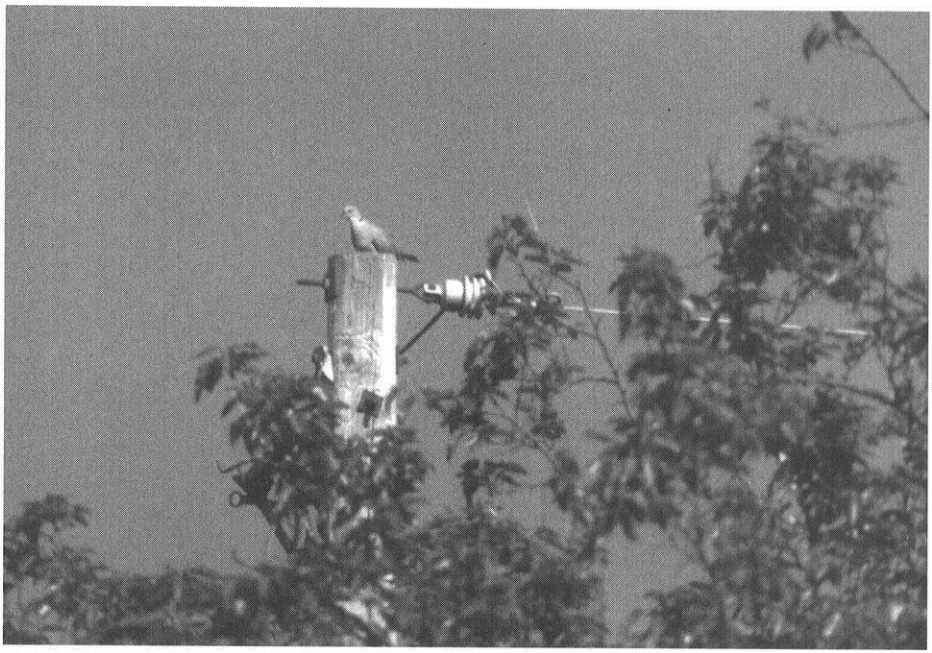

Figure 1. Wisconsin's first state record for Eurasian Collared-Dove appeared at Noel Cutright's home in West Bend, Ozaukee County, in May 1998. This obliging individual was seen by many birders between 19 May and 27 June. Photo by Noel Cutright.

rows, Rose-breasted Grosbeak, Bobolink, and Eastern Meadowlark.

Reports came from 78 contributors this year, tying the all-time high of two years ago. The reports again were significantly enriched by observers covering Wisconsin Breeding Bird Atlas blocks who took the extra time needed to prepare and send their records to us. Atlas work and visits by others to areas not frequently covered helped to keep the list of counties without any kind of coverage quite short: Clark, Lafayette, Racine, Taylor, and Waushara.

Reports
(1 June 1998–31 July 1998)

Common Loon.—Of the 17 counties from which this species was reported, the most southern were Ozaukee in the east (Frank, July 2) and Chippewa in the west (Polk).

Red-necked Grebe.—Noted by a number of observers at Lake Maria in Green Lake County. Ziebell found 9 nests and 32 birds in Winnebago County June 19. Also present in Dodge County June 9 (Domagalski).

Eared Grebe.—Reported from Dodge County June 4 and Green Lake County June 4–23 (Tessen) and from Marathon County June 6–7 (Belter, Ott).

Western Grebe.—A bird was present June 10–July 2 in Winnebago County (Hall, M. Peterson, Tessen).

American White Pelican.—Recorded in Douglas (Johnson, July 9) and Bayfield (Verch, July 17) Counties in the north, and La Crosse and Vernon Counties in the west (Lesher, July 18–21). In the east, where this species now breeds, birds were noted in these counties: Brown (Hall reported 53 present July 19), Door, Oconto, and

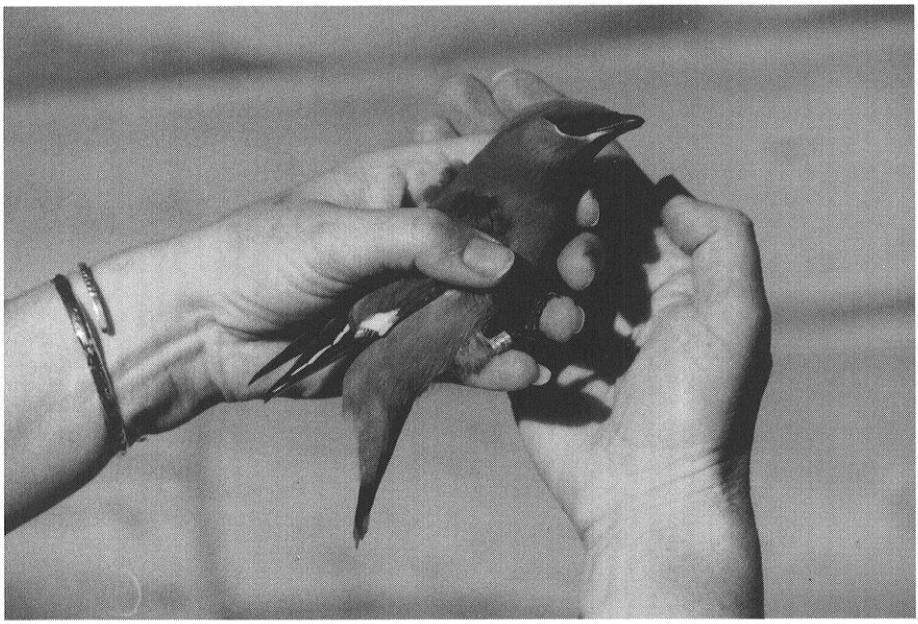

Figure 2. This Langlade County Bohemian Waxwing—Wisconsin's first summer record—was brought to wildlife rehabilitator Marge Gibson in late July 1998. Photo by Don Gibson.

Winnebago. A Horicon Marsh Bird Club field trip July 19 found 50 birds near the Main Dike (Dodge County).

Least Bittern.—Noted in Brown, Dodge, Douglas, Jefferson, Kenosha, Oconto, Ozaukee, Waupaca, Winnebago, and Trempealeau Counties.

Snowy Egret.—Up to 3 birds were seen by a number of observers in July in Brown County.

Tricolored Heron.—The bird present in Brown County in May was still there June 15 (Tessen).

Cattle Egret.—Although several observers located this species in Brown County, it appears to be less easy to find there than formerly. Ziebell found 40 birds and 10 nests in Winnebago County July 1. Noted also in Dodge County (Robbins, Wood).

Yellow-crowned Night-Heron.—A bird was present in Milwaukee County at least until July 10 (Korducki, M. Peterson, Tessen).

Snow Goose.—There have been reports in most recent years, and this year was no exception. Tessen observed one with late migrating Canada Geese June 8 in Winnebago County, and Hall found 3 in Brown County July 6.

Mute Swan.—This year's reports came from these counties: Ashland, Bayfield, Dane, Door, Marathon, Oconto, Ozaukee, Portage, Shawano, Washington, and Winnebago.

Trumpeter Swan.—Reintroductions in various locations are leading to reports from an increasing number of counties: Ashland/Bayfield, Burnett, Dodge, Forest, Langlade, Oneida, and Polk.

Gadwall.—Noted in these counties: Dodge, Dunn, Fond du Lac, Green Lake, Manitowoc, Oneida, Shawano, and Waupaca.

American Wigeon.—Observers found this species in Ashland/Bayfield, Dane, Douglas, Dunn, Milwaukee, Ozaukee, and Winnebago Counties.

American Black Duck.—Reported from Dodge, Manitowoc, Milwaukee, and 9 northern counties.

Northern Pintail.—Noted in only 4 counties: Bayfield, Dodge, Milwaukee, and Winnebago.

Canvasback.—Birds were recorded in Dunn County June 17 (Tessen), Green Lake County June 12 (Robbins), and Oneida County June 9 (the Fishers).

Greater Scaup.—Noted through June 3 in the Ashland/Bayfield County area (Verch), and later in Kewaunee (Domagalski), Manitowoc (Sontag), and Milwaukee (Frank, Korducki, Tessen) Counties.

Lesser Scaup.—Reported from Bayfield, Dane, Green Lake, Kewaunee, Manitowoc, and Milwaukee Counties.

Bufflehead.—Present in Ozaukee County through July 9 (Frank, Korducki, Uttech) and in early June in Ashland/Bayfield (Verch) and Green Lake (Tessen) Counties.

Common Goldeneye.—Noted the first week of June in Douglas, Green Lake, Manitowoc, and Winnebago Counties. Present through the season in Door County (the Lukeses), and near the end of July in Green Lake (Nussbaum), Kewaunee (Domagalski), and Oneida (Tessen) Counties.

Red-breasted Merganser.—Reported through the period from Ashland/Bayfield (Verch) and Door (the Lukeses) Counties. Also present in Milwaukee County through June 22 (Korducki, Tessen) and in Manitowoc County through June 10 (Sontag).

Ruddy Duck.—Ziebell counted 80 in Winnebago County June 19. Noted in these additional counties: Columbia, Dane, Dodge, Dunn, Fond du Lac, Green Lake, Milwaukee, Outagamie, and St. Croix.

Osprey.—Seen in 28 counties, more than in many years. Most unusual were 2 birds in Kenosha County through much of the season (Hoffmann). Present again in Winnebago County (Bruce). Birds appearing in several other counties in the south in the last half of July may well have been migrants.

Bald Eagle.—A few were present in Dane and Iowa Counties through the season (Ashman). Noted also in Green Lake, Kenosha, Outagamie, Portage, Waupaca, Winnebago, and in 23 more northern counties.

Sharp-shinned Hawk.—Observed again in Walworth County (Parsons). Noted also in Ozaukee County through July 11 (Uttech), in Outagamie and Winnebago Counties (Tessen), in Waupaca County throughout the season (Hewitt), and in 14 more northern counties.

Northern Goshawk.—Reported from these counties: Door throughout the season (the Lukeses), Forest July 2 (the Smiths), Marathon July 1 (Belter), Oneida July 2–9 (the Fishers, Schipper), and Vilas July 5 (Baughman).

Red-shouldered Hawk.—As usual, most of the 20 reporting counties were in the southern or central part of the state, but observers also found this species in these northern counties: Florence (Reardon), Menominee (H. Peterson), Oconto (the Smiths), Oneida (the Fishers), and Shawano (M. Peterson).

Broad-winged Hawk.—Noted in Grant (Belter), Manitowoc (Holschbach), Sauk (Robbins), and 22 more northern counties.

Swainson's Hawk.—Two birds, one seen and described particularly well, were observed June 5 in Sauk County (Bill Foster, Robbins). See "By the Wayside."

Merlin.—Observed in these counties: Ashland/Bayfield, Door, Douglas, Forest, and Oneida.

Peregrine Falcon.—Reports this season came from Brown (Tessen), Buffalo and Vernon (Lesher), Kenosha (Hoffmann), Manitowoc (Sontag), and Milwaukee (Korducki) Counties.

Gray Partridge.—Noted in Columbia (Ashman), Door (the Lukeses), Jefferson (Hale), and Ozaukee (Frank, Uttech) Counties.

Ruffed Grouse.—As usual, most reports came from central and northern counties, with the most southern locations being Grant (the Smiths), Green (Ashman), and Richland (Duerksen) Counties. Noted in 26 counties in all. Hall found 38 in Marathon County June 28.

Spruce Grouse.—Spahn found a female and at least 8 young in Vilas County June 30 and

Figure 3. Immature Cooper's Hawk feeding on prey, LaCrosse County, Wisconsin, July 1998. Photo by Fred Lesher.

an additional bird in Forest County July 2, a day before Uttech also located one there.

Sharp-tailed Grouse.—Recorded only in Chippewa (Polk) and Douglas (the LaValleys) Counties.

Greater Prairie-Chicken.—Noted in Marathon (Ott) and Portage (Tessen) Counties.

Wild Turkey.—The 32 counties in which observers found these represented most parts of the state.

Northern Bobwhite.—Might a bird in Oneida County June 14 (Uttech), far from normal range, possibly have been an escape? Noted in 13 additional counties within range, Chippewa being the most northern in the west (Polk) and Green Lake in the east (Schultz).

Yellow Rail.—Reported only from Shawano County July 11 (H. Peterson).

King Rail.—Since 1986, this species has never been reported from more than 2 counties per summer (and in 2 years not at all). This year's reports came from Kenosha County (Hoffmann, one seen well) and Winnebago County (Tessen).

Common Moorhen.—Noted in these 9 counties: Brown, Dane, Dodge, Jefferson, Kenosha, Oconto, Ozaukee, Walworth, and Winnebago.

American Coot.—Ziebell found 492 birds and 55 nests in Winnebago County June 19. Observed in 24 counties in all.

Sandhill Crane.—The 35 counties in which observers found these represented most parts of the state.

Black-bellied Plover.—Lingered in 4 counties into June, latest in Langlade County June 6 (Stephanie Hinz fide Domagalski). Had returned to Manitowoc County by July 29 (Hall).

American Golden-Plover.—Noted June 27 in Dodge County (Soulen) and July 30–31 in Bayfield County (Roy, Verch).

Semipalmated Plover.—Most spring migrants departed by the first week of June, but

Figure 4. Badger making a meal of two Sharp-tailed Grouse chicks in Douglas County, Wisconsin, 8 June 1998. A photograph of this same animal appeared in *The Passenger Pigeon,* Vol. 60, No. 3, 1998. Photo by Kent Hall.

stragglers were still present in Milwaukee County until June 15 (Korducki) and in Brown County until June 18 (Regan). The fall vanguard appeared in Milwaukee County July 7 (Korducki) and in Ozaukee County July 10 (Uttech), with arrivals in other areas spread over the next 2–3 weeks.

Piping Plover.—Wisconsin's first known nesting attempt since 1983 fledged 3 young on Long Island, Ashland County (Sumner Matteson fide Trick). A migrant was present in Dane County June 13 (Domagalski, Hansen). See "By the Wayside."

American Avocet.—Birds put in one-day appearances in 2 counties: Marathon July 20 (Belter, Hall) and Ozaukee July 22 (Uttech).

Greater Yellowlegs.—Last noted June 4–5 in 4 locations, with returning birds appearing first in Dodge County July 3 (Robbins) and then in several other counties within the next 10 days.

Lesser Yellowlegs.—There were early June reports from 7 counties, latest in Dodge County June 12 (Robbins). Returned to Dodge County by June 25 (Korducki) and to 4 additional counties within the next 2 days.

Solitary Sandpiper.—Noted in Dodge County June 4 (Tessen) and in Shawano County June 5 (H. Peterson). A June 26 report from Jefferson County (Hale) preceded other observations by almost a week, with most migrants not being noted until after the first week in July.

Willet.—More reports than in most summers, from Bayfield County June 4 (Roy), Dodge County June 27 (Soulen, Wood), Milwaukee County June 4 and 29 (Korducki), and Outagamie County June 20–21 (Hall, M. Peterson, Tessen).

Whimbrel.—Noted only in Kewaunee County June 16–17 (Regan).

Hudsonian Godwit.—Not often observed in summer, this species appeared in Dane County June 4 (Ashman) and in Milwaukee County June 3 (Korducki).

Marbled Godwit.—Reported from Dodge County June 9 (Domagalski) and July 3 (Rob-

bins), and from Manitowoc County July 27 (Sontag).

Ruddy Turnstone.—Lingered until June 4 in Bayfield County (Roy), June 10 in Winnebago County (Ziebell), and June 11 in Manitowoc County (Sontag). Returned to Manitowoc County by July 29 (Hall).

Red Knot.—Noted June 4 in Bayfield County (Roy) and until June 14 in Manitowoc County (Tessen).

Sanderling.—Present into June in 6 counties, latest June 7 in Winnebago County (Tessen). Fall migrants appeared first in Manitowoc County July 19 (Hall).

Semipalmated Sandpiper.—Always a late migrant, this species lingered latest in Dane County (Ashman, present continuously through June 26). Had returned to Dodge County by July 2 (Tessen) and to several other locations within the next week.

Western Sandpiper.—One was in Manitowoc County July 12 (Sontag, Tessen).

Least Sandpiper.—There were more early June reports than usual, the latest in Milwaukee County on the 15th; it was a mere 10 days before fall migrants had returned there (Korducki). Birds arrived in 4 additional counties within the next few days.

White-rumped Sandpiper.—Berner found 46 birds in Portage County as late as June 7, and there were 4 in Dane County June 14 (Evanson). The only fall migrants reported were in Columbia and Dodge Counties July 14 (Robbins) and in Manitowoc County July 29 (Hall).

Baird's Sandpiper.—There were considerably more reports than usual, from 10 counties in all. The latest spring straggler was noted in Dodge County June 9 (Domagalski), and birds had returned to Columbia County by July 10 (Robbins) and to Ozaukee County by July 11 (Uttech).

Pectoral Sandpiper.—Lingered until June 8 in Ozaukee County (Strelka), and returned to Dodge County by July 7 (Domagalski) and several other areas by the 10th.

Purple Sandpiper.—A bird in Kewaunee County July 11 and 12 was Wisconsin's second summer record (Domagalski, M. Peterson, the Smiths, Tessen, Uttech). Accepted by the WSO Records Committee. See "By the Wayside."

Dunlin.—Observed in 10 counties during the first week of June. Still present in Milwaukee County June 21 (Korducki).

Stilt Sandpiper.—Still present June 4 in Dodge County, to which birds had returned by July 6 (Tessen). Noted in 5 additional counties within the next 2 weeks.

Ruff.—Korducki saw and described well a female (Reeve) in Milwaukee County June 3, providing Wisconsin's sixth summer record. Accepted by the WSO Records Committee. See "By the Wayside."

Dowitcher sp.—Almost no one provided documentation for their reports of either dowitcher species.

Short-billed Dowitcher.—Birds had appeared by July 2 in Dodge (Tessen) and Milwaukee (Frank) Counties and in 4 additional counties within the following 10 days.

Long-billed Dowitcher.—Noted in Manitowoc County July 3 (Sontag) and in Dodge County July 16, and Brown County July 25 (Tessen).

Wilson's Phalarope.—Reported from Dodge County June 9–July 26 (Domagalski, Robbins), Brown County June 11 (Regan), Dane County June 26 (Ashman), Ozaukee County July 11–18 (Uttech), and Shawano County July 22 (H. Peterson).

Red-necked Phalarope.—Present in Dunn County June 2–3 (Gamache), Dane County June 4 (Ashman), and Dodge County July 3–7 (Domagalski, Larry Michael, M. Peterson, Tessen, Wood).

Franklin's Gull.—Noted only in Milwaukee County June 21 (Korducki).

Little Gull.—For the first time in many years, there were no reports.

Bonaparte's Gull.—The only observations away from Lake Michigan or Lake Superior were in Calumet County July 31 (Tessen), Vernon County July 21 (Lesher), and Winnebago County through July 1 (Ziebell). Noted in 11 counties in all.

Thayer's Gull.—A bird was reported from Sheboygan County June 6 (the Brassers, M. Peterson).

Iceland Gull.—One was in Manitowoc County June 4 (Tessen).

Glaucous Gull.—Observed in Manitowoc County June 4 (Tessen) and July 23 (Sontag, Soulen, Peter Weber), and in Ozaukee County June 5 (Uttech).

Great Black-backed Gull.—Reported from Manitowoc County June 4 (Tessen, 3 birds) and July 23 (Sontag, Soulen, Peter Weber), in Kewaunee County June 9 and July 22, and in Door County June 24 (Regan), and Sheboygan County through the period (the Brassers, Domagalski).

Caspian Tern.—Noted in more counties (17) than in many recent years, with most reports away from Lake Michigan and Lake Superior coming in July.

Common Tern.—Ziebell found 60 birds and 30 nests in Winnebago County on June 6. Except for birds in Chippewa County at the end of July (Polk), the remaining records (8 additional counties) all came from areas bordering Lake Michigan or Lake Superior.

Forster's Tern.—Ziebell found 212 birds and 54 nests in Winnebago County on June 19. Noted in 12 counties in all.

Black Tern.—Ziebell found 70 birds and 14 nests in Winnebago County June 19. Reported from 30 counties in all.

Eurasian Collared-Dove.—The state's first record of this species was of an obliging bird that visited Noel Cutright's home in Ozaukee County May 19–June 27 (Bontly, Cutright, Gustafson, Strelka). Amazingly, a second bird appeared briefly in Portage County July 26–29 (Belter, Hall, M. Peterson, Schaufenbuel, Tessen). Accepted by the WSO Records Committee. See "By the Wayside."

Yellow-billed Cuckoo.—Most reports of this species came from southern and central counties, but birds were noted also in Marinette, Menominee, Oneida, and Washburn Counties. Found in 21 counties in all.

Short-eared Owl.—The only report came from Shawano County July 3 (H. Peterson).

Northern Saw-whet Owl.—Noted in Marinette County June 27 and in Vilas County July 6 (Spahn).

Red-bellied Woodpecker.—Of the 32 counties from which this species was reported this season, the most northern were Barron, Chippewa, Marathon, Oconto, Shawano, and Washburn.

Yellow-bellied Sapsucker.—Observed feeding young in Manitowoc County July 2 (Holschbach). Reported from 32 counties in all.

Black-backed Woodpecker.—Reported more this season than in some years, from these counties: Ashland (Verch, Ryan Brady), Forest (Tessen, Uttech), Oneida (Hall), Price (Hardy), Shawano (H. Peterson), and Vilas (Spahn).

Olive-sided Flycatcher.—A migrant was still present June 12 in Eau Claire County (Polk). Noted in Ashland, Bayfield, Douglas, Florence, Forest, Oneida, and Forest Counties within range.

Yellow-bellied Flycatcher.—There were the usual scattered early June reports from southern counties; the latest were June 11 (Manitowoc County, Sontag) and June 12 (Milwaukee County, Zehner). A bird was present again in Dewey Bog/Marsh, Portage County, but it is not known whether it remained beyond June 13 (Berner). The remaining observations were in Ashland, Bayfield, Douglas, Forest, Shawano, Oneida, Vilas, and Washburn Counties.

Acadian Flycatcher.—Noted again in Portage County (Berner, Hall), as well as in neighboring Marathon (Belter, Berner) and Wood (Berner) Counties. Other reports came from 10 more southern counties.

Alder Flycatcher.—Considering how late this species can migrate, it is difficult to know whether a Grant County bird June 14 was a resident (Domagalski). Among the 31 counties in which observers found this species this season, the most southern were Dane, Iowa, Ozaukee, and Washington.

Willow Flycatcher.—The most northern of the 32 reporting counties were Douglas, Marathon, Menominee, Oconto, Price, and Shawano.

Western Kingbird.—A bird was seen several times in Sauk County between June 24 and July 15 (Putnam).

Loggerhead Shrike.—Atlas work yielded records of 4 nests, in Langlade, Marathon, and St. Croix Counties. Birds were found also in Brown (Holschbach) and Dane (M. Peterson) Counties.

White-eyed Vireo.—Governor Dodge State Park in Iowa County again hosted this species (Domagalski, Hall, Tessen).

Bell's Vireo.—Noted in Dunn (Polk, nested), Grant (Belter, the Smiths, Tessen), Iowa (Domagalski, Robbins, Soulen, Tessen), La Crosse (Lesher), Shawano (H. Peterson), and Winnebago (Tessen) Counties.

Yellow-throated Vireo.—Reported from 33 counties, including these northern ones: Ashland, Bayfield, Douglas, Florence, Forest, Oconto, Oneida, and Vilas.

Blue-headed Vireo.—Observers found these in 15 counties, the most southern of which were Eau Claire (Polk), Jackson (Tarachow), and Wood (Berner).

Philadelphia Vireo.—Present again in the same place in Bayfield County where one was first found last summer (Frank, July 17). See "By the Wayside."

Gray Jay.—Perhaps because of Atlas work, observers found these this summer in more counties than usual: Ashland, Bayfield, Douglas, Florence, Forest, Oneida, Price, Shawano, and Vilas.

Boreal Chickadee.—Noted in Ashland (Verch), Forest (Belter, Tessen), Oneida (Belter, the Fishers, Tessen), and Vilas (Baughman, Spahn) Counties.

Tufted Titmouse.—Relatively few reports, from these counties: Dane (Soulen), Chippewa, Dunn and Eau Claire (Polk), and Grant (Belter, the Smiths, Tessen).

Red-breasted Nuthatch.—Holschbach found 10 pairs in Point Beach State Forest, Manitowoc County. Present through the season in Dane County (Ashman), and in Winnebago County through July 4 (Ziebell). The other reports came from 22 counties further north.

Brown Creeper.—Nested in Jackson Marsh, Washington County (Domagalski). Noted also in Jefferson County June 15 (Hale, Libby Zimmerman). Except for Grant County, where it is regular (Belter), the remaining observations came from 17 central and northern counties.

Carolina Wren.—A pair nested successfully in Waupaca County (Hewitt). Reported also from Dane County July 18 (Ashman) and Manitowoc County July 15 (Sontag).

Winter Wren.—Belter found 3 at Wyalusing State Park, Grant County. Domagalski considered it "very common" in Jackson Marsh, Washington County. Present through the season in Ozaukee County (Uttech) and also in Sauk County (a number of observers). Remaining reports came from 15 more northern counties.

Marsh Wren.—Ziebell found 350 in Winnebago County June 19. Noted in 36 counties in all.

Golden-crowned Kinglet.—Recorded in 11 counties, more than usual. Present again in Portage County (Berner), the southernmost of the reporting locations.

Ruby-crowned Kinglet.—Reported from these counties: Ashland/Bayfield (Verch), Douglas (the LaValleys), Florence (Reardon), Forest (the Fishers, the Smiths, Soulen), Oneida (Belter, the Fishers), Price (Hardy), Shawano (H. Peterson), and Vilas (Baughman).

Blue-gray Gnatcatcher.—Observed in 31 counties, the most northern of which were Bayfield (Frank) and Vilas (Spahn).

Swainson's Thrush.—The latest spring migrant was noted in Winnebago County June 7 (Bruce). Reported within breeding range from Forest (Soulen, Spahn, Tessen) and Menominee (H. and M. Peterson) Counties. A fall migrant appeared July 28 in Brown County (Regan).

Northern Mockingbird.—A pair attempting to nest (an egg was laid) in Eagle River, Vilas County, was seen by many observers. One of the pair unfortunately was killed by a local resident. A second nesting was confirmed in Columbia County, with 3 birds still present July 30 (Ashman). Also present from June 22 on in Door County (the Lukeses). Additional reports came from Calumet County July 28 (Tessen, a roadkill), Forest County July 2 (the Smiths), Oneida County June 2–25 (the Fishers), and Marathon County July 26 (Ott).

Bohemian Waxwing.—A truly amazing summer record resulted from a presumed Cedar

Figure 5. A pair of Carolina Wrens raised two broods in Waupaca County, Wisconsin, during the summer of 1998. Photo by John Fountain.

Waxwing being brought to Marge Gibson's rehabilitation center in Langlade County in late July. The bird recovered and was released. There have been no previous Wisconsin summer records. Accepted by the WSO Records Committee. See "By the Wayside."

Blue-winged Warbler.—Observers found these in 23 counties, the most northern being Marathon (Belter), Portage and Wood (Berner), Barron (Goff), Chippewa (Polk), Menominee (H. Peterson), and Shawano (M. Peterson).

Brewster's and Lawrence's Warblers.—The Portage/Wood County area seems to be a hot spot for these hybrids, with Berner finding them again this season. A male Brewster's, paired with a Golden-winged, was carrying food in Wood County June 20. In Portage County, two Brewster's were found in mid-July; a male Lawrence's was noted on June 8, in the same area one has been seen in previous years; a female Blue-winged was feeding both a Blue-winged and a Lawrence's fledgling in this area on July 20 and 23; in this same area a male Golden-winged and female Blue-winged were feeding nestlings on July 20.

Tennessee Warbler.—No spring stragglers were observed this year. A bird in Brown County July 23 was undoubtedly a migrant, but it is harder to categorize birds in Marinette County June 27 (Spahn), in Douglas County from July 7 on (Johnson), and in a different part of Douglas County July 10 (the LaValleys).

Northern Parula.—Still present in Ozaukee County June 8 (Strelka). An adult female seen well in Pike Lake State Park, Washington County, on July 1 was very unusual (Domagalski). Might a bird in Portage County July 14 (Berner) have been a migrant? Noted in an additional 11 counties within range.

Chesnut-sided Warbler.—Reported from 31 counties in all, the most southern being Dane, Grant, Milwaukee, and Washington.

Magnolia Warbler.—Still present June 5 in Sauk County (Robbins), June 7 in Winnebago County (Ziebell), and June 8 in Ozaukee County (Strelka). A bird hit a window in Milwaukee County June 13 (Diehl). Holschbach observed 4 pairs, one of them feeding young, in Point Beach State Forest, Manitowoc County. Noted in an additional 12 counties, all more northern.

Cape May Warbler.—Reported from these counties: Ashland (Verch), Bayfield on July 16 (Frank), Door from June 1–July 14 (Stover), Forest on June 6 (Soulen), Marathon on June 1 (Belter), Oneida on June 23 (the Smiths, 3 birds), and Shawano on June 3 (H. Peterson).

Black-throated Blue Warbler.—Noted in Ashland/Bayfield (Verch), Door (Stover), Forest (Soulen, Spahn), Menominee (H. Peterson, Tessen), Oneida (the Fishers), Shawano (H. and M. Peterson), and Vilas (Baughman, Spahn) Counties.

Yellow-rumped Warbler.—Holschbach found 17 pairs in Point Beach State Forest, Manitowoc County. Present in Green Lake County June 25 (Schultz). Noted in an additional 20 more northern counties.

Black-throated Green Warbler.—Still present in St. Croix County June 4 (Soulen), and in Grant (the Smiths) and Ozaukee (Uttech) Counties June 6. Holschbach located 31 pairs in Manitowoc County. Domagalski called them "common" in Jackson Marsh in Washington County. Noted in 22 counties in all.

Blackburnian Warbler.—Present in Pierce County June 3 (Rudesill), Portage County June 12 (Berner), Grant County June 14 (Belter), and Sauk County June 23 (Tessen). Noted in an additional 13 counties further north.

Yellow-throated Warbler.—A bird first found in Brown County in May was present through June 8 (Baumann), and another was in Door County through June 13 (Regan). A number of observers found up to 2 males in Wyalusing State Park, Grant County. A male was in Baxter's Hollow, Sauk County, June 5 (Robbins) and 23 (Tessen). See "By the Wayside."

Kirtland's Warbler.—Ten observers were able to locate a male at the Vilas County site where this species was located last year, but it was not reported after June 15. The WSO Records Committee accepted a number of these records. See "By the Wayside."

Prairie Warbler.—A male first found in Willow River State Park, St. Croix County, in May remained at least until June 23 (M. Peterson, Robbins, Tessen, Wood).

Palm Warbler.—Present again in Portage County (Berner, 4 birds on June 13). Noted also in Ashland/Bayfield, Forest, Oneida, and Vilas Counties.

Bay-breasted Warbler.—Still present in Ozaukee County June 7 (Uttech). A male in Buffalo County July 16 was an early fall migrant; a male in Portage County July 20 likely was also a migrant (Berner). Verch reported this species from Ashland County in July, but its status—migrant or resident—was not known.

Blackpoll Warbler.—Still present in Winnebago County June 1 (Ziebell).

Cerulean Warbler.—Reported from 10 counties, the most northern being Marathon (Belter), Menominee (H. and M. Peterson), and Shawano (H. Peterson).

Prothonotary Warbler.—A singing bird in Brown County June 5 was unusual (Korducki). Noted also in Buffalo, Dodge, Grant, Iowa, La Crosse, Portage, and St. Croix Counties.

Worm-eating Warbler.—A number of observers reported the bird in Baxter's Hollow, Sauk County.

Northern Waterthrush.—Domagalski considered these "abundant" in Jackson Marsh, Washington County. Located also in Fond du Lac, Green Lake, Ozaukee, and 16 more northern counties.

Louisiana Waterthrush.—Reported from Grant (Belter), Iowa (Domagalski), Portage (Berner), Sauk (Domagalski, Robbins, Tessen), and, rather far north, Shawano and Waupaca (H. Peterson) Counties.

Kentucky Warbler.—A bird reported from Shawano County July 7 was very unusual (H. Peterson). Also found in its normal haunts in Grant County (Domagalski, Soulen, Tessen).

Connecticut Warbler.—A very late migrant was in Manitowoc County June 17 (Sontag). Verch found a family group of 5 in Iron County July 14. Also reported from Douglas, Forest, Jackson, Menominee, Oneida, and Vilas Counties.

Mourning Warbler.—Noted in 33 counties in all, most of them central and northern.

Hooded Warbler.—A good number of reports. Belter found 4 in Wyalusing State Park, Grant County, on June 15. Holschbach observed

2 pairs feeding young and 3 additional singing males in Point Beach State Forest, Manitowoc County. Nested in St. Croix County (Joe Hudick fide Soulen). Noted also in Kenosha, Menominee, Milwaukee, Sauk, Shawano, Sheboygan, Waupaca, and Washington Counties.

Wilson's Warbler.—Lingered until June 3 in Shawano County (H. Peterson) and June 8 in Ozaukee County (Strelka).

Canada Warbler.—A late migrant was in St. Croix County June 4 (Soulen). Present through July 2 in Ozaukee County (Bontly, Strelka). Five were in the Jordan Marsh, Portage County, on June 28 (Berner). Nested in Jackson Marsh, Washington County (Domagalski). Noted also in Sauk and in 11 more northern counties.

Yellow-breasted Chat.—Nesting reports came from 3 counties: Iowa (fide Bettie Harriman and Tessen), Kenosha (Hoffmann), and Outagamie (Holschbach). Noted also in Dane (Ashman, M. Peterson), Fond du Lac (Mueller), and Ozaukee (Strelka, Uttech, Wood) Counties.

Summer Tanager.—An adult male, seen well, in Dane County June 10, constitutes Wisconsin's third twentieth century summer record (J. Peterson). See "By the Wayside."

Field Sparrow.—Reported from Douglas, Florence, Forest, Oneida, and 37 more southern counties.

Lark Sparrow.—Noted in Dunn (Polk, Tessen), Eau Claire (Polk), Iowa (Ashman), and Sauk (Domagalski, Robbins, Soulen, Tessen) Counties.

Grasshopper Sparrow.—Observers found these in Door (the Lukeses), Oconto (the Smiths), and Vilas (Spahn) Counties, as well as in 21 more southern ones.

Henslow's Sparrow.—There were reports from Chippewa (Robbins), Marathon (Belter), and Shawano (H. Peterson) Counties, as well as from 11 more southern ones.

Le Conte's Sparrow.—Reported from Bayfield (Frank), Douglas (Johnson, the LaValleys), Marathon (Belter), Oneida (Spahn, Tessen), and Shawano and Waupaca (H. Peterson) Counties.

Lincoln's Sparrow.—Present again in Dewey Marsh, Portage County (Berner). Noted also in Ashland/Bayfield, Douglas, Forest, Marathon, Marinette, Menominee, Oneida, and Vilas Counties.

White-throated Sparrow.—Still in Dane County June 4 (Ashman). Considered "abundant" in Jackson Marsh, Washington County (Domagalski). Also present in Ozaukee County (Bontly, Strelka) and in 22 central and northern counties.

White-crowned Sparrow.—Birds were seen well in Door County July 6–10 (Regan) and July 30 (Stover), and in Waukesha County June 16 and 18 (Schaefer). It is not known whether the Door County observations were of the same bird; the locations were over 5 miles apart. See "By the Wayside."

Dark-eyed Junco.—A family group was in Menominee County July 10 (M. Peterson). Other observations were in these counties: Ashland/Bayfield, Forest, Douglas, Marinette, Oconto, Oneida, and Vilas.

Northern Cardinal.—Among the 43 counties from which observers reported these, the most northern were Barron, Bayfield, Douglas, Oconto, and Oneida.

Dickcissel.—Not a banner year in terms of numbers, but noted in over a third of the state's counties (25). Although birds were present in a few areas at the beginning of June, most observers did not find any before mid-month. The northernmost reports came from Chippewa (Polk), Marathon (Belter), Shawano (M. Peterson), and Oconto (the Smiths) Counties.

Eastern and Western Meadowlarks.—Rudesill found a mixed pair in Pierce County. Easterns were found in 43 counties, Westerns in 20.

Yellow-headed Blackbird.—Ziebell found 500 birds and 12 nests in Winnebago County June 19. Noted in 17 counties in all.

Orchard Oriole.—Found in 12 counties this year: Door, Dunn, Eau Claire, Iowa, La Crosse, Ozaukee, Polk, Richland, Sauk, St. Croix, Walworth, and Washington.

House Finch.—Observed in 47 counties statewide.

Red Crossbill.—There were reports from these counties: Bayfield July 16 (Frank), Douglas

from June 29 on (the LaValleys), Forest July 22 (Tessen), Oneida June 6 (the Fishers), Portage June 26 and July 30 (Berner), Menominee July 9 and Shawano July 22 (H. Peterson), and Vilas June 14 (Baughman).

White-winged Crossbill.—Noted in these counties: Ashland/Bayfield (Verch), Douglas July 8 (Johnson), Forest June 11 (Uttech), Menominee and Shawano July 7–9 (H. Peterson), Oneida June 7 (the Fishers) and July 22 (Tessen), Sawyer in late July (Pike), and Vilas from June 18 on, with a peak of 25 on June 27 (Baughman).

Pine Siskin.—Reported from 14 counties in all, most of them northern. A number of observations were on single days only.

Contributors

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Thomas K. Soulen
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"By the Wayside"

Documentation is provided for June and July 1998 sightings of Swainson's Hawk, Piping Plover, American Avocet, Western Sandpiper, Purple Sandpiper, Ruff, Great Black-backed Gull, Eurasian Collared-Dove, Western Kingbird, Philadelphia Vireo, Bohemian Waxwing, Yellow-throated Warbler, Kirtland's Warbler, Prairie Warbler, Summer Tanager, and White-crowned Sparrow.

Swainson's Hawk (*Buteo swainsoni*)

5 June 1998, Sauk County—Two birds were seen circling together over open farmland and woodlot edges southwest of Baraboo, viewed for three minutes through 8.5× binoculars at about 150 yd until the birds moved out of range. Size and shape similar to Red-tailed Hawk, but wings seemed a bit more narrow, especially near the tips. As the birds soared, the wings were held noticeably above the horizontal plane, but not as pronounced as in the Turkey Vulture and Northern Harrier. The most obvious feature was the two-toned effect created by light wing linings and dark flight feathers. The tails were barred. One bird showed the brownish upper breast distinctive of this species. We (Bill Foster and I) couldn't be sure of upper breast feathering of the second bird.—*Sam Robbins, 14 S. Roby Rd., Madison, Wisconsin 53705.*

Piping Plover (*Charadrius melodus*)

May–July 1998, Ashland/Bayfield County—On 20 May 1998, Sumner Matteson of the Wisconsin Department of Natural Resources (WDNR) observed two color-banded Piping Plovers on Long Island/Chequamegon Point, Lake Superior, in the Apostle Islands National Lakeshore. (Long Island and Chequamegon Point, although usually depicted topographically as distinct landforms, together essentially comprise one long peninsula—several miles in length—of beach, dune, wetland, and wooded habitats.) These birds exhibited prenesting behavior, with one bird making "dummy" scrapes in sand over an area of approximately 250 sq m, about 40–50 m from the water's edge on the lake side of the peninsula.

On 5 June 1998, the WDNR's Eric Epstein visited the area and found a scrape with four eggs—the first time since 1983 that nesting has occurred in

the state (when Matteson last observed a Piping Plover nest in the same general area). On 10 June, a contingent of representatives from the National Park Service, Bad River Tribe, University of Minnesota, and WDNR installed a predator-proof enclosure around the plover nest, and signs to announce that the area was closed to human use. Within 45 seconds of installing the enclosure, an adult Piping Plover returned to incubate the eggs. Dave Parisien of the Bad River Tribe monitored the nest and served as a plover warden, camping on the peninsula to keep recreationists away from the enclosure.

On 6 July, a similar government contingent (after consultation with the U.S. Fish and Wildlife Service [USFWS] East Lansing, Michigan, field office) returned to the peninsula to locate, capture, and band young. Three of the four eggs had hatched on 30 June. All three young were subsequently marked with special steel bands (standard aluminum bands are not used in this case because of the wear that results from frequent contact with salt water during wintering) and color-banded: silver USFWS bands 1371–09429 through 431, with a "kelly green" band attached above the silver band on the left leg. Of the breeding adults, the male—light blue band over silver band on the left leg—was apparently hatched out in 1997 at Grand Marais, Michigan, and the female—black over silver on the right leg—hatched out in 1997 at Wilderness State Park, Michigan. Grand Marais is located some 225 miles east of the nest site, also on Lake Superior, and Wilderness State Park is located just west of the Straits of Mackinac in northern Lake Michigan.

All three plover chicks were alive and close to fledging on 23 July 1998, according to Geoffrey Smith, Resource Management Specialist for Apostle Islands National Lakeshore.—*Sumner Matteson and Eric Epstein, Bureau of Endangered Resources, Wisconsin DNR, Box 7921, Madison, WI 53707; Julie Van Stappen, Apostle Islands National Lakeshore, National Park Service, Box 729, Old Courthouse Building, Bayfield, WI 54814; Thomas Doolittle, Bad River Band of Lake Superior Ojibwa Tribe, Box 39, Odanah, WI 54861; and Joel Trick, USFWS, Green Bay Field Office, 1015 Challenger Court, Green Bay, Wisconsin 54311.*

13 June 1998, Nine Springs Sewage Treatment Plant, Dane County—One bird seen with Kay Burcar and Brenda Bauer. Dull, pale brown back and head, white undersides. Complete black ring around neck. Short black line across forehead, separating the pale tan top of head from white above bill. Bill is yellow-orange with black distal tip. Legs are yellow.—*Bob Domagalski, W140 N8508 Lilly Rd., Menomonee Falls, Wisconsin 53051.*

13 June 1998, Nine Springs Sewage Treatment Plant, Dane County—Appeared to be size of Semipalmated Plover. Very pale light tan-gray. One dark ring around neck, may have been broken in front. Could not see it well straight on. Small black patch on top of forehead. Legs bright yellowish orange. Bill light with dark tip.—*Ellen Hansen, 10 Spear Circle, Madison, Wisconsin 53713.*

American Avocet (*Recurvirostra americana*)

20 July 1998, Marathon County—I drove out to the Three Lake's Marsh in western Marathon County to look for

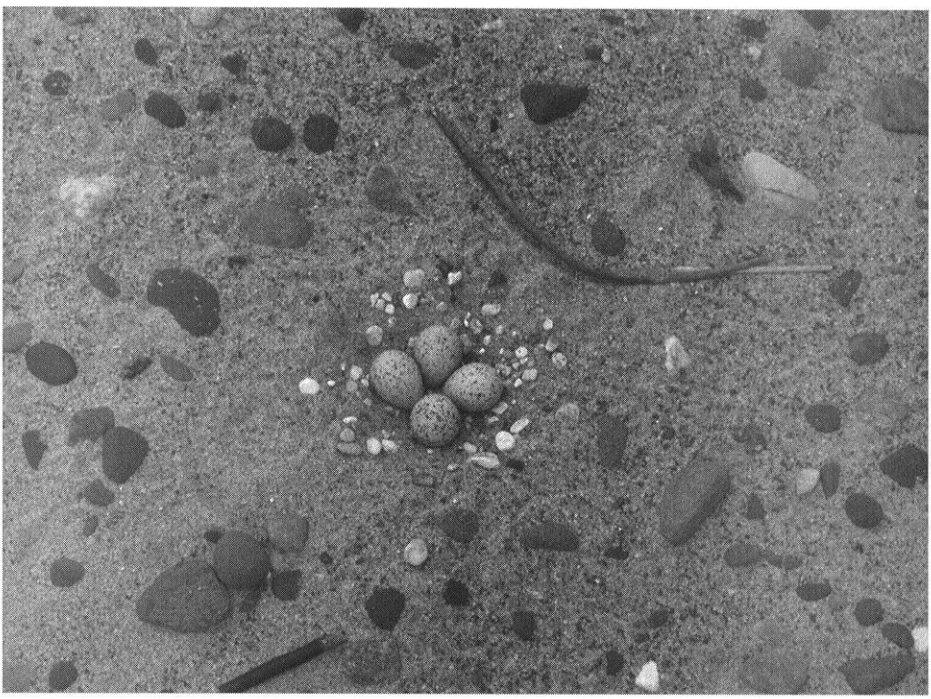


Figure 1. Piping Plover nest with four eggs on Long Island, Lake Superior, in the Apostle Islands National Lakeshore, 10 June 1998. This was the first recorded nesting attempt by this species in Wisconsin since 1983. Photo by Sumner Matteson.

shorebirds. It was 7:30 P.M. when I arrived. While making my first scan of the marsh, I found the bird right away. It was not in full breeding plumage. The head and neck were a faded, rusty brown. The belly was white. The back had a black and white pattern and the legs were dark. When the bird wasn't preening, it was usually resting or feeding. When feeding, it would sweep its long, thin, upturned bill sideways, back and forth across the water surface. Three times the bird took flight. On the third flight, it took off to the southeast and never returned. While it was in flight, I could [see] the black and white pattern and white tail.—*Dan Belter, 523 Mobile Avenue, Wausau, Wisconsin 54403.*

WESTERN SANDPIPER (*Calidris mauri*)

12 July 1998, near Two Rivers, Manitowoc County—I was alerted to at least 2 Western Sandpipers on Hillcrest Road and Highway 42 (about 3 miles north of Two Rivers) by Charlie Geigle. Daryl Tessen arrived moments after me as he returned from a successful outing to Kewaunee and the very early Purple Sandpiper. The Western Sandpiper was found in a mix of peeps that included several Least Sandpipers in the immediate vicinity. Later a Semipalmated Sandpiper was found for the final comparison. The bird was not in typical fall plumage and presented some initial difficulty. The bird was larger than both the Least and Semi-

palmated, but only slightly larger than the latter. The feet were dark and the bill was longer than the head was wide. The bill was also thicker at the base compared to both the Least and Semipalmated, but was not noticeably "drooped" as often pictured. The crown was rusty, as were parts of the nape and mantle, although the lighter fall plumage was beginning to appear, giving a slightly mottled coloration. The bird was not heard, but the feeding behavior with the head/bill more perpendicular to the surface was noted. The breast area was lightly streaked, but not as extensively as in the Least Sandpiper.—*Charles Sontag, 801 N. 4th Street, Manitowoc, Wisconsin 54220.*

Purple Sandpiper (*Calidris maritima*)

11 June 1998, Kewaunee Harbor, Kewaunee County—A medium-sized, squat, dark-colored shorebird that fed along the water line of a rock jetty by the Kewaunee Harbor entrance. The legs were orange-yellow. The rather long and down-curved bill was dusky with an orange-yellow base. The dark plumage seemed intermediate between basic and alternate. The head was mostly black-gray with little streaking that I could tell. The faint eye ring was visible. The upper breast was not yet solid dark; I could notice streaking. The wings and back of the bird were a uniform blackish brown with a pale mottling. There was streaking along the flanks. In flight, the bird showed a dark tail and a narrow white wing stripe.—*Robert C. Domagalski, W140 N8508 Lilly Rd., Menomonee Falls, Wisconsin 53051.*

12 July 1998, Kewaunee Harbor, Kewaunee County—A single plump shorebird was found feeding on the rocks nearest the Coast Guard station. This brownish-colored bird was about the size of a Ruddy Turnstone. The head and breast were a brownish gray color. The belly was white, with some streaking on the flanks. The back was a scaly gray. There was a very faint eye ring. The bill, with a slight droop at the end, was dark gray on the distal three quarters and a dull orange on the proximal one quarter. The legs and feet were a dull yellow-orange. The bird fed actively on the rocks for the 15–20 min that we watched it.—*Mark S. Peterson, Box 53, Caroline, Wisconsin 54928.*

12 July 1998, Kewaunee Harbor, Kewaunee County—Upon arriving at the north side of the old Coast Guard Station (now Snug Harbor), we walked to the end of the fence at the new riprap and began viewing the jetty. Almost immediately, I spotted a sandpiper foraging at the rocky water line about 75 ft from the jetty end. The bird was heavier-bodied than a Spotted Sandpiper, and showed a dark brownish-gray cast, [with] dark brown spotting in front down to the upper belly [which] petered out along the flanks. The back was dark brownish-gray with a purplish cast of even color, with some light edges to a few feathers. The head had a dark brownish cap, a dark eye with a narrow light/whitish eye ring, and a dark line under the eye from the bill to the back of the head. Above the eye was evidence of a faint supercilium. The head appeared to be slightly streaky, but changing to blended at the rear. The dark bill drooped near the tip and the basal half inch showed a smudged, yellowish cast. The belly was

white and the rump and upper tail were dark with white edging. The legs and three-toed feet were yellowish. When viewed from the rear, two of the tertials showed white edging.

During several short flights, the narrow white upperwing line was seen, along with the dark-centered rump and tail with white edging. During preening, the underwing linings were whitish to beige colored near the primary tips. The outer third of the primaries showed a much lighter brown (almost tannish) and worn look. The bird appeared to show portions of remnant breeding plumage and some evidence of changing to winter plumage.—*Jerry H. Smith, 6865 Fredrickson Road, Lena, Wisconsin 54139-9538.*

Ruff (*Philomachus pugnax*)

3 June 1998, Coast Guard Impoundment, Milwaukee County—There was a good number of shorebirds present as I scoped along the edge of the water. One larger bird [a female Ruff, also known as a Reeve] fed by itself. It was about the same size as a Lesser Yellowlegs, but was chunkier and the plumage was a darker, warmer brown. The bill was fairly short and stout with no curves. Legs were orangish-yellow. A dark line ran through the eye but there was no obvious eye ring or superciliary line. The plumage was most similar to a Pectoral Sandpiper. The streaking on the breast, however, extended farther down and did not have the clean, abrupt termination. This bird was also larger and longer legged than a Pectoral Sandpiper, but the legs were not as long as those of a yellowlegs. The bird was actively feeding and then abruptly joined in as a nearby flock of Semipalmated Sandpipers took flight. By the time I located the bird in the flock, it was too far to get a clear view of the rump or wings. In flight, the bird was clearly twice the size of the peeps. The flock circled once, but then continued on to the north. I waited, but they did not return.

Comparison with other species: Size was closest to Lesser Yellowlegs, but the Reeve was chunkier and shorter legged. The breast was heavily streaked to form a bib, rather than speckled. Legs were closer to orange than yellow. Back color was warmer and without the white speckles. These traits rule out Solitary Sandpiper as well. Stilt Sandpiper would have green legs, a white superciliary line, and a slightly downcurved bill. The bill was much too short to be a dowitcher. This bird was taller and browner than a knot. The closest species would be a Pectoral Sandpiper, but this bird appeared too large to be a Pectoral, even with the wide size variation in that species. This bird was taller and had a more erect posture than a Pectoral. The most convincing feature was the pattern of the breast. Instead of fine streaking that has a clean termination, this bird had more diffuse streaks that did not have an even or clean ending. This pattern seemed to extend farther down the breast. Size was noticeably larger than the nearby Dunlins and Semipalmated Sandpipers.—*Mark Korducki, 2955 N. 77th St., Milwaukee, Wisconsin 53222.*

Great Black-backed Gull (*Larus marinus*)

23 July 1998, Manitowoc County—Seen while birding the Manitowoc/Two Rivers lakeshore with my birding companions of 50 years, Peter Weber and Tom Soulen. The bird was obvious

by its size and coloration, with light head and darker back/mantle. The very large bill was black, but lighter at the base. The plumage was most consistent with a first-year bird, because the mantle was not showing evidence of black mottling. The bird was swimming most of the time during our observations, but on occasion offered views of its banded tail. This observer did not see the feet. This was the largest gull in the immediate area, which included Herring Gulls and a subadult Glaucous Gull. The size of the bill alone precludes all other North American gulls.—*Charles Sontag, 801 N. 4th Street, Manitowoc, Wisconsin 54220.*

Eurasian Collared-Dove (*Streptopelia decaocto*)

1–27 June 1998, 0.5 mi E of CTH Y on Knollwood Rd., Town of Saukville, Ozaukee County—Larger and more robust than a Mourning Dove, and with a different posture and way of perching on wire/pole. More active on perch than a Mourning Dove, turning frequently. Mostly all gray to a sandy-brown, except for black neck collar, bordered with white, on back and extending around on side part way, darker primaries, dark underside of rectrices. Gray undertail coverts contrast with these dark rectrices and white tips of rectrices; no white edging noted. Tail square or at least rounded, not pointed. Iris reddish (obvious in good light only), feet pinkish.

Two vocalizations were noted. "Koo-Kooooo'-Kook," (not rolling) usually given in a long series, emphasis on second syllable, neck inflated while calling. Also a nasal, mew call resembling that of catbird, long and drawn out, given only in flight. Perched on tops of utility poles and wires primarily, rarely on ground, on tree limbs a few times. Visited birdbath once in mid–June, did not visit bird feeder. Observed on ground with Mourning Doves a couple of times. [Collared-Dove] tried to court Mourning Doves; Kate could call to bird and saw it respond excitedly. Roosted in white cedar and dense deciduous thicket.

Had an exaggerated flight with wings up (not sure if they clapped), and then gliding with wings and tail outspread. Skittish or shy, hard to approach early on, but became tamer over time, curious when approached.

Expansion in Europe well chronicled. Spread in U.S. documented in *Field Notes,* with records now in Illinois, Iowa, and Minnesota in the upper Midwest.—*Noel J. Cutright, 3352 Knollwood Rd., West Bend, Wisconsin 53095.*

2 June 1998, Knollwood Road, West Bend, Ozaukee County—The bird perched on a wire and pole about 150 ft from the front of Noel Cutright's house. The bird was pale tannish-gray overall, blackish primaries were darker than rest of plumage. The dark tail had a white terminal band that showed as the bird flew from wire to pole, but the tail was rounded, not pointed as in the Mourning Dove. On the nape of the neck, a half-collar of narrow black edged in silver was visible when the bird offered a side view. The song consisted of three "coo-coo-coos" repeated several times in succession.

The Eurasian Collared-Dove's overall size was about that of a Mourning Dove, 11–12 in, but the bird was heavier bodied and appeared bigger partly due to the shorter, more rounded tail. When the tail was closed, the white showed on the edges of the

tail and partway up the tail.—*Marilyn Bontly, N94 W5725 Dorchester Drive, Cedarburg, Wisconsin 53012.*

5 June 1998, Knollwood Road, West Bend, Ozaukee County—The Eurasian Collared-Dove was slightly larger and chunkier than a Mourning Dove. It had a larger head than a Mourning Dove. It was an overall pale gray color with the back being slightly darker than the wings. A thin, black collar circled the back of its head just below the nape. The tail was a brownish-gray color and the tips of its inner tail feathers, evident when the bird flew, were white except for the middle feathers. (It seemed as though this bird might have been missing one of its inner tail feathers, since the brownish-gray center seemed wider on the left side of the bird.) The tail was squared at the tip. The eye and bill were dark. I did not notice the color of the feet or legs. The breast and belly were a buffy-gray color.

We watched the bird fly from one telephone post to another several times and had good looks at the bird both in flight and while sitting. It landed most often on top of the poles rather than on the wires. The bird had a three-note "coo coo coo," slightly higher in pitch than a Mourning Dove.—*Jean M. Strelka, 9418 N. Green Bay Road Apt. 138, Brown Deer, Wisconsin 53209.*

7 June 1998, Knollwood Road, West Bend, Ozaukee County—After a two-hour wait and false alarms with Mourning Doves, my wife Margot and I decided to take one last walk along the driveway toward the main road. As we neared the road, we heard a strange call, almost like a soft squawk, and a dove landed on the telephone line right in front of us. The dove was about the same length as a Mourning Dove, but quite a bit heavier. The overall color was paler and more gray, not tan as on a Mourning Dove. Distinctive marks included a squarer end to the tail with white edges, white near the base of the tail, and a black collar across the nape of the neck, like on a Ringed Turtle-Dove (Ringed Turtle-Dove is *much* paler, and more sandy-colored than gray). The eye and bill were blackish (I didn't note leg color). The dove gave a soft three-noted "coo" several times. More distinctive was the hard-to-describe, squawking call note, given whenever it landed. This dove is much more active than Mourning Doves, never sitting still for long in one place. It flew further down the telephone line after a minute or two, then flew over us to another pole behind us, eventually flying behind the house and disappearing, all within 5 or 6 minutes.—*Dennis K. Gustafson, 15440 Linfield Lane, New Berlin, Wisconsin 53151.*

26 July 1998, CTH F and Mill Road, Portage County—First observed a plump, light tan bird perched about 15 ft up in a bare tree. Seemed to be pigeon sized with a slightly longer tail. It was obviously a dove, with a strong resemblance to a Ringed Turtle-Dove. Pale tan head, underbelly, and nape. Breast seemed slightly darker, as did especially wing coverts and primaries. I did not have binoculars, but feel I could have seen the neck ring without binoculars if it was there. I approached as closely as I could and the bird flushed, showing white corners on an otherwise tan/brown tail. Noting the dark wings, plump shape, lack of collar, and white tail corners, I identified

it as a White-tipped Dove. Observations the next day in better light with binoculars showed it to have a neck collar and much more uniform color to body and more extensive white in tail corners than originally perceived. I did not hear the bird call to distinguish from Ringed Turtle-Dove. However its color, size, and shape were suggestive more of the Collared-Dove than the Ringed Turtle-Dove.—*Joe Schaufenbuer, 5676 Regent Street, Stevens Point, Wisconsin 54481.*

27 July 1998, CTH F and Mill Road, Portage County—Soon after we arrived at 6:15 A.M. the bird flew into a dead tree located just northeast of a small pond in the northeast corner of the intersection. As it landed, it spread its tail which was clearly short, square, and extensively white for half the length of the tail. This feature eliminated the bird as a White-tipped Dove. Our first observation was from nearly 300 ft so we moved closer (200 ft) for a better view. In this view, the bird clearly showed a "collar" on the back of its neck that was black and lined with white. The bird appeared to be somewhat larger and slightly lighter than a Mourning Dove. I excluded it as a Ringed Turtle-Dove because of its darker color and more extensive white on its tail. The land owners at Buena Vista Ranch (southeast corner of the intersection) revealed that the bird had been coming to their feeders for "about two weeks." Joe [Schaufenbuer] and I decided that we would park and wait to see if it flew in. It did not come to the feeder again but we did see it in flight and it had the distinct appearance of a Rock Dove in flight.–*Kent D. Hall, 200 Pine Bluff Road, Stevens Point, Wisconsin 54481.*

27 July 1998, CTH F and Mill Road, Portage County—The Eurasian Collared-Dove was about 100 ft from me,

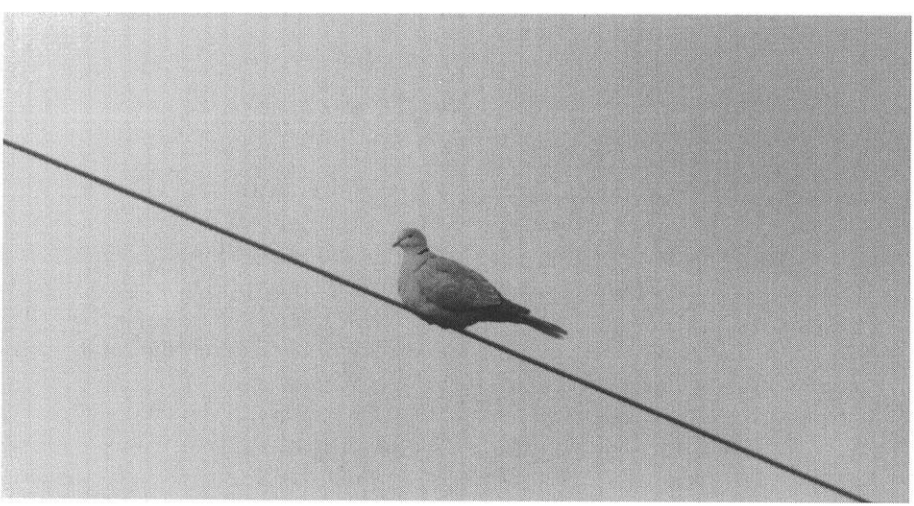


Figure 2. The summer of 1998 saw the discovery of Wisconsin's first and second records for Eurasian Collared-Dove. This bird, the second record, was observed in Portage County, 26–29 July. Photo by Roger Tess.

sitting at the top of a 30-ft spruce tree. I walked slowly to about 60 ft from the bird when it took flight. It seemed to be "jumpy," as if it didn't want me getting too close. The dove flew down Hwy. F and landed on the wire next to the road. When in flight, I noticed that its tail was more or less round in shape, not pointed like a Mourning Dove, and it had white at the end of the tail. I went to my car to get my spotting scope. I had just gotten my scope set up when the bird returned to the yard and landed on a telephone pole about 30 yd from me. At this point, I had an excellent view of the dove. I could clearly see the black band on the back of its neck that was bordered by a thin white edge. The color of the body was a light gray, much lighter than the two Mourning Doves near by. I also saw that this bird had red eyes and dark pink legs. The bill was black. After about 5 min of just sitting there, the dove started to look nervous. Then two Mourning Doves that were on the ground by the bird feeder took flight and landed on the wire about 6 ft from the bird. At this moment, the dove puffed up its neck and gave out a three-note "coo-coo-coo." Sitting close to the Mourning Doves, the Collared-Dove appeared to be as large as the Mourning Doves, but chunkier.—*Dan Belter, 523 Mobile Avenue, Wausau, Wisconsin 54403.*

28 July 1998, Junction of CTH F and Mill Road, Portage County—I arrived with my wife at the junction of Highway F and Mill Road in Buena Vista Marsh about 7 P.M. After looking over the area near Mill Road, I got out of the car and headed south along Hwy. F to the Buena Vista Ranch, just south of Mill Road. Three Mourning Doves flew by, then another plumper, lighter tan dove landed in a tree about 75 ft from me. This bird had a dark bill about the same size and length as a Mourning Dove's. The eye was dark. The overall length of the bird was similar to that of a Mourning Dove, but the tail was shorter and more rounded. The overall color was a light tan. Some white was noted on the tail, but a good view of the tail was never seen. A noticeable black band, bordered in white, was seen on the back of the neck. A three-note call was heard several times. The first and third notes were short. The second note was much longer with a buzzy quality to the note. The bird was seen also at the farm south of the Buena Vista Ranch and sitting on a wire about 100 yd north of Mill Road.—*Mark S. Peterson, Box 53, Caroline, Wisconsin 54928.*

Western Kingbird (*Tyrannus verticalis*)

24 June–15 July 1998, Badger Army Ammunition Plant, Sauk County—Plumage: The bird was a large-headed, gray and yellow *Tyrannus* flycatcher. The head, throat, and chest were gray, with the throat having the lightest shade of gray. A black band extended from the beak through the eyes and ended near the ears, short of the back of the head. The back and wings were also gray, but were somewhat darker because of an olive-brown cast to them. No wing bars were evident. The rump was a lighter shade of gray than the back and wings. The lower breast to undertail coverts were yellow. The yellow feathering extended up under the lifted wing. The tail was black except for the outer rectrix on each side of the tail; these two rectrices were white.

Soft parts: The beak was black. Eye color was not recorded, but was presumably dark because it did not contrast with the black feathering around them. Leg color was not recorded.

Voice: Two different vocalizations were heard. The first was a jumble of notes which sounded like audio tape being rewound in a tape recorder. The second vocalization was a sharp "kip" note given singly, but repeatedly.—*Michael S. Putnam, Department of Zoology, University of Wisconsin, 430 Lincoln Drive, Madison, Wisconsin 53706.*

Philadelphia Vireo
(*Vireo philadelphicus*)

17 July 1998, Chequamegon National Forest, Delta Quad, Bayfield County—Rechecking the spot where I found a Philadelphia Vireo last year, I found the same flurry of activity as I found the previous year. Among the birds observed at this opening in the aspen trees were Red-eyed Vireos with fledglings, Yellow-throated Vireos carrying food, and a Philadelphia Vireo. The bird was briefly but clearly seen. The green-gray back and off-white breast and belly were evident on this vireo-sized bird. The cap was grayish. The eye line was dark and abbreviated relative to the Red-eyed, emphasizing the lore portion of the line. The white eye line above this did not appear separated by a black line as with Red-eyed. The upper breast had a yellowish wash. No wing bars were present. The foraging behavior consisted of slow and deliberate movements with significant pauses in movement (not nearly the seemingly incessant motion of warblers). No vocalization was discerned. Despite another 30 min of observation, I could not relocate the bird. In that time a Timber Wolf walked down the hill to within 30 yd of me, disappearing when I moved to get a better look at it!—*James C. Frank, 4339 W. Laverna Avenue, Mequon, Wisconsin 53092.*

Bohemian Waxwing
(*Bombycilla garrulus*)

24 July 1998, Elcho, Langlade County—On the evening of 24 July, I received a call from a resident in rural Elcho who said that a Cedar Waxwing had hit the window by her feeder earlier in the day. She put the bird in a box with a towel as I had instructed. Since it was late, the bird was kept overnight and transferred in the morning to my rehab center. A handwritten note was taped to the box, explaining how the bird had been seen feeding with several "other Cedar Waxwings" at a bird feeder for several days. It was thought that the injured bird was a male due to the fact that it was bigger and brighter in color than the other Cedar Waxwings. I didn't think too much about this comment until I opened the box and WOW! If this was a Cedar Waxwing, then it had been eating steroid-laced berries up there in Elcho! The bird was indeed larger than a Cedar Waxwing, and stocky and dark-colored as well. His rusty red tail coverts and face were brilliant next to the young Cedar Waxwing I happened to have in at the same time for rehabilitation. The body was basic charcoal-gray as opposed to the yellowish-tan belly of the Cedar Waxwing. Finally, the white stripe and yellow lacing on the wings confirmed my suspicions—this bird was an adult Bohemian Waxwing. The bird was alert and awake but looked like it still had quite a headache. The good thing about having a bird "in

hand" is you can get a field guide and look for the things that you might forget to note if you were glancing at a bird in a bush. Upon examination of the wings, there were the white wing patches, too. I had never fully appreciated the difference in size between the two waxwings. Bohemians are definitely more stocky, chunky, and larger all over.

The bird was in good weight and after a few days was back to flying and acting normally. He made attempts to feed the young Cedar Waxwing, but would take the berry back and eat it just as the juvenile would attempt to accept it. I found the interaction interesting. Cedar Waxwing adults almost can't help themselves but to feed young birds in their presence, at least in captivity.

Since the bird had apparently been living in the Elcho area, it was banded, photographed, and released in the same area three days after coming into rehabilitation.—*Marge Gibson, Raptor Education Group, Inc., N2160 W. Rollwood Rd., Antigo, Wisconsin 54409.*

YELLOW-THROATED WARBLER (*Dendroica dominica*)

1–8 June 1998 (first noted 20 May), Bay Beach Wildlife Sanctuary, Brown County—About 40 ft inside the gate, I saw a bird moving down from a high cottonwood, chasing insects. The bird dropped down to about 15 ft off of the ground and 25 ft into a relatively high shrub layer. My first impulse was that it was a Black-throated Green Warbler without a black throat. I said, "Ida, look at that warbler. I believe it is a Yellow-throated Warbler." The bird hastily retreated and could not be relocated. Over the next two to three weeks we saw and heard the bird, most often in picnic ground spruce trees, three or four times in cottonwoods, and my best look in a large willow next to the Nature Center. Since the bird was almost always high up in large canopy, I always heard loud, musical, clear [notes] descending with higher note at end before actually seeing the bird. Bright yellow throat and chin, black-and-white head, with a strong white eye stripe; undersides white with black stripes or streaks on its sides; top of head, back gray; wing stripes, although seen, not real definite.—*Ty Baumann, 1660 East Shore Drive, Green Bay, Wisconsin 54302.*

1 June 1998, Wyalusing State Park, Grant County—I had spent the better part of the morning searching for a Yellow-throated Warbler between Pt. Lookout and Green Cloud Hill in Wyalusing State Park. Having been unsuccessful I decided to lunch at the Homestead picnic area. As I was preparing my lunch, I heard the Yellow-throated song very near the picnic table. The song sounded like "Tyew, tyew, tyew, tyew, tyew, si, si, seet". I was able to determine which tree the song came from, but had only the briefest look when it descended to a lower branch near the trunk of the spruce from which it sang. I saw the bright yellow throat and black streaks along the flanks, but nothing more. It soon flew to a tall pine about 100 yd away and sang for 40 minutes, but I never was able to locate it visually at this perch.—*Thomas C. Wood, W166 N9162 Grand Avenue #7, Menomonee Falls, Wisconsin 53051.*

KIRTLAND'S WARBLER (*Dendroica kirtlandii*)

5 June 1998, South of Land O'Lakes, Vilas County—As I drove into the jack

pine plantation, I heard the loud song of a Kirtland's Warbler. After a short search, I observed the bird as it perched on the top of a jack pine. I could see the bluish-gray back, rump and tail. The back was heavily streaked with black and the tail was edged with white. The tail was not pumped in the Palm Warbler style that some Kirtland's do. When the bird turned, I could see the black lores and broken eye ring. The throat and breast were unstreaked. The streaking was confined to the flanks of the bird. The yellow was somewhat paler under the tail. This bird was unbanded. I was able to observe it at leisure as it worked around a territory and seemed undisturbed by my presence. I spent some time in the center of the territory with the slim hope that I might locate a female. Unfortunately, I was unsuccessful. The bird was still singing persistently when I left. The song was the seven- to eight-note chatter slightly similar to the Northern Waterthrush. The call rose slightly in pitch and then ended abruptly.—*Mark Korducki, 2955 N. 77th Street, Milwaukee, Wisconsin 53222.*

3 June 1998, Jack Pine plantation, Vilas County—I arrived at the same area where two Kirtland's Warblers had been last year. About a half mile in from the main road the familiar song with three to four ascending introductory notes, followed by two higher notes, followed by one to two lower notes was heard to the east of the trail. I went to the intersection of about four to five trails and then took the trail to the southeast toward the bird. I quietly approached to within about 30 ft of this bird and found it perched about 15 ft up in a jack pine. Its bright yellow breast and belly had dark streaking on the flanks. Two faint whitish wing bars could be seen. The head and back were a dark bluish-gray. There was a noticeable white eye ring. There also was some dark streaking on the back. After about a minute, the bird dropped out of sight and I quietly left the area. The bird continued to sing as I left.—*Mark S. Peterson, Box 53, Caroline, Wisconsin 54928.*

1 June 1998, Northern Vilas County—Arriving at the site where two Kirtland's Warblers were found last year, the lone bird this year was heard singing immediately. The first low notes were followed by a series of rapid notes, higher than the first part. It was obviously marking its territory as it moved around. The territory did not include the road, so it remained to the east. However, I eventually noted that its northern border abutted a road. Moving over there, I was soon rewarded with a brief (1 min) view of it, as it came out on an adjacent limb of a jack pine.

The back was blue-gray, with black stripes. The belly was yellow with dark streaks along the sides. The face was darker than the body. It flicked its tail during the time it was in view.—*Daryl D. Tessen, 3118 N. Oneida, Appleton, Wisconsin 54911.*

Prairie Warbler (*Dendroica discolor*)

2 June 1998, Willow River State Park, St. Croix County—This bird had been reported on the WSO hotline so I decided to look for it along the park trails. As I descended into a small valley I immediately recognized the buzzy song, and with some effort found the bird singing near the top of a tall sap-

ling. I saw the yellow throat and breast, black streaking along the flanks, and black crescent under the eye. A thin black line passed through the eye on a yellow face. After the bird flew to a new location, I was able to climb partway up the opposite side of the valley and had a view of the upperparts which were olive-green on the crown and back. Reddish-brown streaks were visible on the back, and two inconspicuous wing bars could sometimes be seen. This bird was a persistent singer, even at this late hour [2:30 P.M.], stopping only for a minute or two during my twenty-minute observation.—*Thomas C. Wood, W166 N9162 Grand Avenue #7, Menomonee Falls, Wisconsin 53051.*

SUMMER TANAGER (*Piranga rubra*)

10 June 1998, Cherokee Marsh State Wildlife Area, central Dane County—I observed the bird foraging high in a deciduous tree (species not noted). It moved from branch to branch picking insects, but its movements were not as quick or active as the two or three warblers flitting nearby.

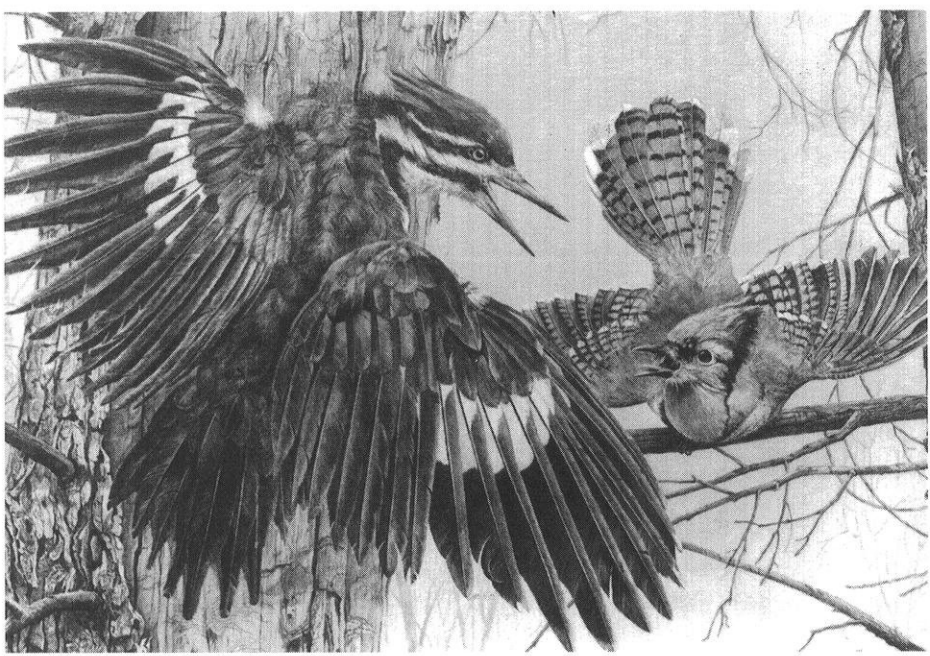
The bird was all red. I looked specifically for other colors on/around the face, on the wings, and on the underside. The only difference in color on any part of the bird was a very slightly darker shade of red on the wings.

The bill was proportionately thicker than a warbler's and seemed somewhat long. The bill was noticeably unfinch-like. Bill color was fairly light. The head was rounded and had no crest whatever. As the bird moved from branch to branch, it appeared to have a fairly horizontal posture.

The bird did not vocalize while I was observing it, although it did open its mouth wide at one point, further accentuating the unfinchlike bill.—*Jesse Peterson, 810 Ganser Drive, Waunakee, Wisconsin 53597.*

WHITE-CROWNED SPARROW (*Zonotrichia leucophrys*)

16–18 June 1998, T 10N R 18E Section 13, Waukesha County—The first thing I notice on a White-crowned is size. Much more plump than other common sparrows of the area (Song, Chipping, House). The crown is the other obvious field mark—you notice the bright white immediately. The breast was an impeccably clear gray, with a somewhat lighter throat and belly. There was no yellow in the lores. The bill also stuck out as an uncommon color for most sparrows—flesh to pink. I would also add that the classic feeding behavior—jump and kick—along with other marks described, made ID rather straightforward. The bird both times was alone, and I heard no vocalization.—*Thomas Schaefer, 3712 Kettle Moraine Road, Hartford, Wisconsin 53027.*



"Encounter" (Pileated Woodpecker and Blue Jay) *by David Kuecherer*

WSO Records Committee Report—Summer 1998

Twenty-four documentations of nine different species were reviewed by the WSO Records Committee for the summer 1998 season. Two other past seasonal reports were also received. Twenty-one reports were accepted and two reports were deferred until more information is obtained. Of note were the continued documentations on Wisconsin's first Eurasian Collared-Dove from Ozaukee County, followed by the second state record from Portage County. Observers were notified of committee decisions by postcard in the case of accepted reports and by personal letter in the case of reports not accepted.

Accepted

Tricolored Heron—

#98–053 *Brown Co.,* 20–31 May 1998, Baumann, Erdman.

The identification was based on the bird being a small heron, the body dark blue-gray, the lower back showing a cinnamon color, but most importantly a contrasting white lower breast. White was also apparent on the "front" of the neck. The bill was blue-gray, with a darker tip. The legs were also blue-gray.

Ruff—

#98–054 *Milwaukee Co.,* 3 June 1998, Korducki.

This shorebird [a female Ruff, also known as a Reeve] was described as being the size of a plump Lesser Yellowlegs; the overall color as a warm brown. The posture of the bird was more erect than a Pectoral Sandpiper. The relatively longer legs were orange-yellow. The bill was relatively short and stout. Although the brown streaking on the breast was similar to a Pectoral Sandpiper, it was more diffuse, extended farther down, and did not end abruptly.

Purple Sandpiper—

#98–055 *Kewaunee Co.,* 11 July 1998, Domagalski; 12 July 1998, Tessen; 12 July 1998, Peterson; 12 July 1998, J. Smith.

This shorebird was described as medium-sized, "plump" or "squat" in build, and gray-brown in color. The head was a somewhat uniform gray color with a very faint eye ring. The upper breast had gray-brown streaking,

the belly was white. A scaly gray appearance was reported on the back. The bill was slightly drooped at the tip, orange on the proximal third, but dark gray on the distal two-thirds. The feet were yellow-orange. In flight, a narrow white wing stripe was seen. Observers felt the plumage was intermediate between breeding and winter plumages.

Eurasian Collared-Dove—

#98–044 *Ozaukee Co.,* 19 May–27 June 1998, Cutright; 30 May 1998, Bauer (photo); 2 June 1998, Bontly; 5 June 1998, Strelka; 17 June 1998, Gustafson.

#98–056 *Portage Co.,* 26 July 1998, Schaufenbuer; 27 July 1998, Hall; 27 July 1998, Belter; 28 July 1998, Peterson; 29 July 1998, Tessen.

These two individuals were described as intermediate in build between a Mourning Dove and a Rock Dove; not as bulky as a Rock Dove, not as streamlined as a Mourning Dove. The tail was relatively longer compared to the body than the tail of a Mourning Dove, but was squared off at the tip as on a Rock Dove. The overall color was a pale sandy tone, lighter than the color of a Mourning Dove. This overall light color was broken only by a black nape crescent outlined in white. Red eyes and dark pink legs were also noted. In flight, the primaries were a darker brown than the general body color. The upperside of the tail exhibited white lateral tips, the underside of the tail was a dark color on the proximal half and white on the distal half. The call was a three-note series of "coos," the second note noticeably longer than the first and last. In flight, a "catbird-like 'cay'" or short series of "cays" was noted in a few instances. These two sightings represent the first and second state records for this species.

Kirtland's Warbler—

#98–048 *Vilas Co.,* 1 June 1998, Tessen; 3 June 1998, Peterson; 5 June 1998, Korducki.

One bird was still present from late May of 1998, in an area where two were observed in the summer of 1997. A larger-than-average warbler was described wagging its tail high in the jack pines. It had a bright yellow chin, throat, and upper belly, but a white lower belly and undertail coverts. Gray streaks were apparent only on the sides of the breast and the blue-gray upperparts had darker streaking along the back. A split white eye ring contrasting with an all dark face was also noted. The gray wings had very thin, indistinct white wing bars. The song was a rather loud, rising series of four low-pitched "chups" followed by several higher-pitched notes. Some observers likened the overall quality to a Northern Waterthrush song, but the song ascended, rather than descended, the scale.

Prairie Warbler—

#98–058 St. Croix Co., 2 June 1998, Wood.

The ascending buzzy song drew attention to this warbler singing in the top of a tree. The yellow face, throat, and breast contrasted with black streaks on the flanks. Black lines were also evident through and under the eye. The upperparts were olive-green with reddish streaks on the back.

Yellow-throated Warbler—

#98–047 *Brown Co.,* 20 May–8 June 1998, Baumann.

#98–059 *Grant Co.,* 1 June 1998, Wood.

A warbler with a black and white head was noted, the eye stripe being white and side of face black. The white breast had black streaks on the flanks, the back and crown were gray. Of course, most striking was the bright yellow throat. The song was a descending series of loud clear notes with a rising note at the end.

Deferred

Neotropical Cormorant—

#98–052 *Brown Co.,* 24 July 1998, (two reports)

A small cormorant, fitting most descriptions and measurements of Neotropical Cormorants, was picked up in weakened condition, and subsequently died in rehabilitation. Further examination of photographs and the specimen will be needed before identification can be confirmed.

Not Accepted

Barn Owl—

#98–057 *Jefferson Co.,* July–17 August 1998.

A fairly large owl, sitting on barns, was described. The call was a piercing shriek. Poor light usually precluded a good look at coloration, but the underparts were very light, the upperparts brown, and one observer thought the face was heart-shaped. Observers consistently noted a lack of ear tufts. After several observers tentatively identified this as a Barn Owl based on the call and silhouette-like views, another observer identified the call as that of a juvenile Great Horned Owl. When the bird was ultimately seen in better light conditions, it was in fact an "ear tuftless" Great Horned Owl. The point to be made is the necessity to see all the possible field marks on any field identification, in particular on rarer, less familiar species. At times, the Records Committee is faced with intriguing, but incomplete, documentations. We cannot identify birds by saying "what-else-could-it-have-been?" Identifications need to be as complete as possible to accurately identify the species by all of its field marks to avoid assuming an identity.

#98–060 *Vilas Co.*

Reported from the same location as a report from the summer of 1997, this documentation is similar to last year's (and the previous Jefferson County report) in that a hissing call, overall light coloration, and heart-shaped facial features are described. Unfortunately, the color of the heart-shaped face and eye color were not listed. This may well have been a Barn Owl, but without a more complete report, this identification is uneasily similar to the previous record that did turn out to be in error.

WSO and the Records Committee would like to thank Randy Hoffman for five years of dedicated service. His thoughtful deliberations on the intricacies of field identification will be missed on the committee. Joining the 1999 committee of Jeff Baughman, Janine Polk, Dennis Gustafson, and Jim Frank will be Bob Domagalski.

Jim Frank
WSO Records Committee, Chair

Robin Fledgling *by Jack Bartholmai*

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James S. Anderson has directed the operation of Mosquito Hill Nature Center in New London for nearly two and one half decades. Birds and habitat preservation play essential roles in his environmental teachings. When away from his 430-acre office and "The Hill," Jim enjoys birding, hiking, nature photography, canoeing and other outdoor endeavors.

Jack R. Bartholmai is an amateur wildlife photographer and wood sculptor. His current focus is photographing the birds of Dodge County, his stomping grounds since 1972. His photos appear frequently in local newspapers, travel brochures, calendars, and maps.

Noel J. Cutright is Ecologist with Wisconsin Electric Power Company and founder of the Riveredge Bird Club. Currently WSO's conservation chair, he also has served as its President, Vice President, and publicity chair.

Jim Frank has been one of WSO's most active contributors to Seasonal Field Notes. He now assists WSO by compiling and summarizing the annual May Day Counts, Big Day Counts and Migration Day Counts and is the Records Committee Chair. He is a veterinarian in Milwaukee with an interest in avian medicine.

R. Tod Highsmith is a free lance environmental sciences writer and is editor of *The Passenger Pigeon.* He received a Ph.D. in Zoology from the University of Massachusetts at Amherst, where he studied the vocal behavior of wood-warblers.

William L. Hilsenhoff is a recently retired Professor in the UW-Madison's Department of Entomology. He has been summarizing Wisconsin's Christmas Bird Counts each year since 1966. He has received WSO's Silver Passenger Pigeon Award for these contributions.

Cary Hunkel has her Master of Fine Arts degree from UW-Madison. Her avian images have appeared in Madison Audubon Society and Wisconsin Department of Natural Resources publications, as well as in the Leigh Yawkey Woodson Art Museum's "Birds in Art."

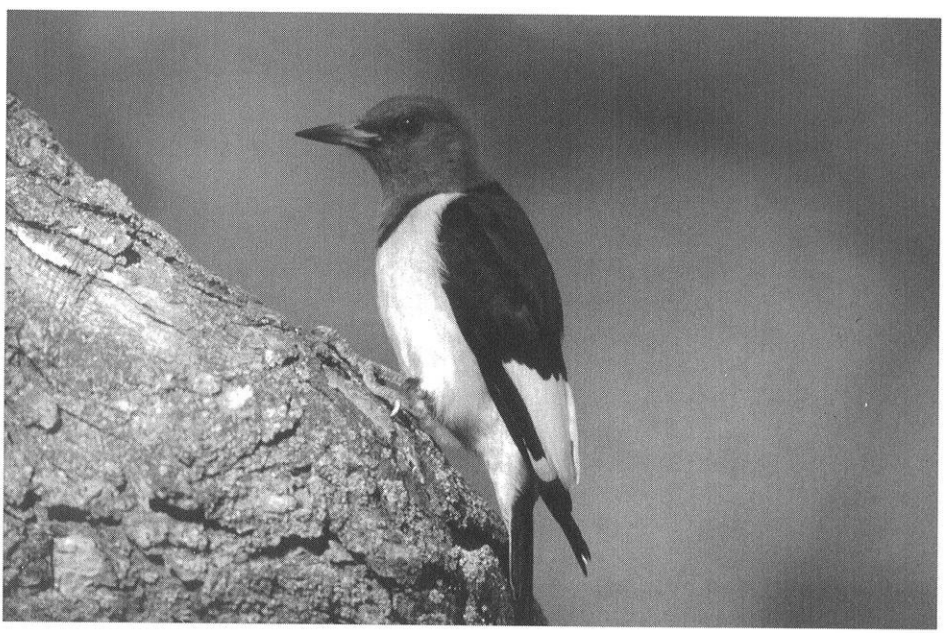
David Kuecherer recently retired after 30 years as a high school art teacher and began to paint birds. Encouraged

as a child to respect and enjoy nature by his father, he now combines his artistic talent with a love of birdwatching. His work has been exhibited in the traveling "Birds in Art" show, and he looks forward to continuing his newfound pursuit at his home in Neenah.

Sumner W. Matteson is an avian ecologist working in the non-game program of the Bureau of Endangered Resources of the Wisconsin Department of Natural Resources. He is a regular contributor to *The Passenger Pigeon.*

Jim McEvoy, a microbiologist by training, has been an art instructor in Madison and spent 20 years as a graphic artist for the Wisconsin Department of Natural Resources before his retirement in 1997. He continues to draw and paint at his home in rural Dane County.

Thomas K. Soulen is one of WSO's hard working Field Note Compilers and a frequent contributor to WSO activities. An expatriate Wisconsinite, now a Professor in the University of Minnesota's Botany Department, Tom has remained active in Wisconsin ornithology.



Red-headed Woodpecker *by Jack Bartholmai*

American Goldfinch *by Jim McEvoy* (Wisconsin Department of Natural Resources)

THE WISCONSIN SOCIETY FOR ORNITHOLOGY

The Wisconsin Society for Ornithology is an educational and scientific non-profit organization founded in 1939 "to encourage the study of Wisconsin birds." The Society achieves this goal through programs in research, education, conservation, and publication.

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