



DEBORAH CRAMER

Flight of the Red Knot

Tracing one of the longest journeys on Earth

PAINTINGS BY JANET ESSLEY



ECHELON

RED KNOTS have many homes, their journey to the Arctic like climbing a ladder, where every rung is necessary and broken ones jeopardize the entire migration. Knots flying from their southernmost home in Tierra del Fuego toward South Carolina and Delaware Bay refuel in southern Brazil, on the sandy beaches and shallow lagoon of Lagoa do Peixe National Park, a refuge for knots, other shorebirds—godwits, turnstones, and plovers—and colorful flamingos and spoonbills.

The knots arrive in April. They bulk up on tiny mud snails, so many that some knots weigh almost half a pound when they're ready to leave. All along the flyway, fat is good: the heavier the birds, the faster they reach their next destination, and when they arrive in the Arctic, the more likely they are to breed successfully.

Pressures are mounting in Brazil to lessen the protected status of Lagoa do Peixe, threatening the park's water quality and the birds' rich repast. If this comes to pass, repercussions will be felt along the entire flyway.

Wherever I've seen knots feeding, I am always taken by their behavior, by the singularity of purpose within a flock. The birds

fly in unison as if they were one, without faltering, without hesitation, tightly spaced but with no threat of collision. Seemingly leaderless, a flock rises and falls above the water, silhouetted dark against the sky and then, instantly, gleaming white in the sun as the flock curves—a ribbon unfurling above the beach, a flawless and seamless coordination. With an uncanny sense of where the best food lies, the birds suddenly hone in on a piece of fertile flat, flying so low and close I can hear the wind rushing through their wings.

The birds head north from Lagoa do Peixe in early May. As the time to leave approaches, flocks begin to gather. No longer feeding with concentration and determination, they're restless, jittery, suddenly flying up off the beach, then just as suddenly, returning. Called by cues we cannot perceive, perhaps they sense a change in the weather and the imminent approach of favorable winds. As afternoon wears on, more and more birds gather, until all at once, they lift off together—a swirling mass of red in Essley's painting—the departing birds a cloud rising higher and higher into fading light until it disappears, birds catching the wind that will help carry them north.



MARANHÃO ENDURANCE

RED KNOTS fly some nineteen thousand miles each year. From southern Brazil, a red knot carrying a data logger flew to North Carolina's Outer Banks, an extraordinary nonstop journey of six days and five thousand miles.

Essley's painting of birds flying through a starry night raises the question of whether birds sleep during these grueling flights. We, who cannot tolerate sleep deprivation, for whom the idea of day after day of sleepless nights is inconceivable, assume they must.

Some animals can be awake and asleep simultaneously. Mallards at the edge of a roosting flock sleep with one eye open, half their brain at rest, the other alert for predators. Dolphins navigate and swim, one eye open and one eye closed.

Can migrating birds hold their altitude and direction while sleeping? We hold a powerful urge to believe. Walt Whitman opens his poem "To the Man-of-War-Bird," about the frigatebird, with "Thou who hast slept all night upon the storm."

French historian and naturalist Jules Michelet is more explicit, writing in his popular 1856 book, "The storm bursts; he [the frigatebird] mounts to lofty heights, where he finds

tranquility. The poetic metaphor, untrue when applied to any other bird, is no exaggeration when applied to him: literally, he sleeps upon the storm."

More than a hundred years later, scientists recorded the brain waves of great frigatebirds in the Galápagos, foraging at sea for up to ten days to feed their chicks. They slept very little, no more than forty minutes all day, no more than twelve seconds at a time, and then only as they soared or glided, their wings still.

Pectoral sandpipers—related to knots—have little time for sleep. Upon arriving at their Arctic breeding grounds, they compete for and defend territories, chase and attract females with aerial courtship displays, all while avoiding predators. Over nineteen days, one pectoral sandpiper remained awake more than 95 percent of the time. The birds that slept the least sired the most chicks.

The birds in Essley's painting depart from the bays and estuaries, mangroves and mudflats of Brazil's Reentrâncias Maranhenses, perhaps sleeping en route to their next stopover in the United States, or perhaps awake and alert the entire time.



ARCTIC INSECT HATCH

ESSLEY'S PAINTING of an insect hatch evokes memories of my travels to the Arctic to find nesting shorebirds—the white background calling up the coastal tundra and upland ridges covered with snow, the frozen lake, the thick sea ice, the cabins and tents of our tiny camp—a gray dot on a vast landscape. I'd come to upper Hudson Bay's Southampton Island, where names of surrounding waters—Frozen Strait, Repulse Bay, Bay of God's Mercy—date to when European explorers sought the fabled Northwest Passage, and still appear on maps as stark reminders of the brutal climate.

Knots nest on islands and peninsulas across the central Arctic. As snow begins to melt, the quiet stillness fills with the songs of courting shorebirds, cracking ice, and running streams. Nests are sparse, about half a mile apart on limestone ridges that are a legacy of the island's tropical past. Over twenty years, scientists looking for knot nests, flying swaths of tundra seeking radio signals from tagged birds, or walking mile after mile, day after day, hoping to locate a nest, have found some forty on Southampton Island.

Life endures in this difficult place, signaled by the green and blue in Essley's painting. Knot nests, when to be seen, lie on

loose gravel amid bits of vegetation—delicate yellow mountain avens or green buds of dwarf willows only an inch or two tall.

When eggs hatch, the weather has warmed and much of the snow has melted, triggering another hatch—an explosion of insects whose peaking numbers coincide with the chicks' need for food. As the climate warms, this synchrony may disappear. Essley's painting portrays the potential consequence of fewer insects and smaller, possibly undernourished birds.

What of the birds' future in this quiet, far-off place nonetheless touched by the hands of humans? The bitterly cold, lichen-studded tundra that characterizes the Arctic will disappear as the tree line advances, and knots will lose their Southampton Island home. Perhaps in the short term, over the next fifty years, they could migrate to similar habitat opening up on islands farther north—King William, Prince of Wales, and Victoria—where, staying ahead of the greening Arctic, they might find refuge. The birds are resilient. Their ancestors survived when the tundra contracted at the height of the last ice age 18,000 to 20,000 years ago, when glaciers buried Southampton Island. If we don't push them beyond Earth's northernmost lands all the way to the edge of the Arctic Ocean, they may continue to survive here.



THREE WAVES

AS THE ARCTIC summer's endless days begin to fade and the weather once again turns stormy, knots funnel out of the remote, mysterious expanse of their nesting grounds into staging areas where they gather to refuel for the long return journey south.

They may stop in salt marshes and mudflats along the delta of the Nelson River in Hudson Bay, alight on limestone beaches of the Mingan Archipelago in the Gulf of St. Lawrence, or fly to the shallow, muddy shores of James Bay, Ontario. They stream out of the Arctic in waves, in what, anthropomorphically speaking, might be considered an extreme case of free-range parenting.

In the first wave are the females, represented in Essley's painting by the bird whose body contains four empty ovals. For three weeks, they'd taken turns with their mates incubating the eggs. When the chicks hatch, the mothers leave, arriving in James Bay in July. The fathers stay behind, escorting chicks off the dry ridges to wetlands and ponds to feed on what, hopefully, are copious quantities of insects. Then, when the birds fledge, the fathers leave, showing up in James Bay in early to mid-August, the second wave—in Essley's painting the yellow-bodied bird above the female. The small bird in the painting behind the others

represents the third wave, the juveniles, who begin arriving in late August, somehow making their way unaccompanied by parents, finding a route they'd never traveled, heading toward a place they've never been.

Over the course of a summer, as many as thirteen thousand red knots will come to James Bay to refuel, each staying for an average of two weeks, feasting on tiny clams packed into the flats. One summer I joined a team of observers there, counting knots. We slept in a Cree hunting camp nestled in a stand of spruce, and each morning, hounded by dense clouds of ravenous mosquitoes, made our way through a tall meadow, passing black bears and their cubs nibbling wild strawberries, to the water's edge, where we'd walk for eight or ten hours looking for flocks of knots. On Canada's Mingan Islands, where other knots touch down as they leave the Arctic, I followed them through thick fog, listening for their soft, melodic calls.

And then, they too will leave. As the days grow shorter, and rippling waves of green from the northern lights shimmer in the night sky over James Bay, and the birds have eaten their fill, they'll head south, some bypassing the United States altogether, nonstop to South America.



SHOREBIRD HUNTING BANS

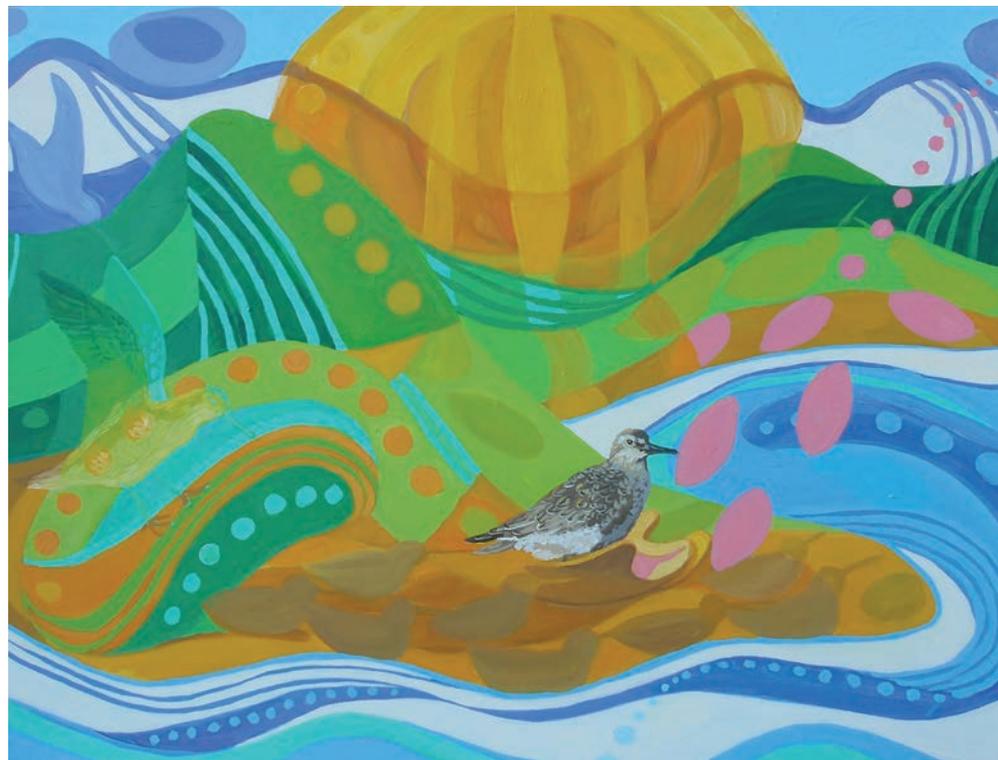
RUSHING CURRENTS and silt pouring into the Atlantic from the Amazon River shape and reshape the coastlines of Guyana, French Guiana, and Suriname, building up muddy tidal flats, tearing away mangrove stands to create lagoons, breaching rice fields at water's edge, and creating habitat that once hosted 2 million shorebirds. Researchers counting shorebirds in Suriname once found three tagged knots banded only a few weeks earlier, in James Bay in Canada.

The birds here are only passing through, fattening up on their way to more distant shores. But at risk of being killed by hunters, many may not reach their destinations. In 2012, ornithologists visiting a rice field at the sea's edge in French Guiana found shotgun shells and seventeen hundred knots littering surrounding dikes. In the early 1980s, in coastal Guyana, a researcher observed four boys vibrating a choke wire they'd strung out at the shoreline, killing 55 shorebirds that flew into it. Afterward they ate fried knot, yellowlegs, stilt sandpiper, and noodles for lunch. Tens of thousands of shorebirds were being killed in Suriname every year.

Lest we cringe, consider North American hunters who slaughtered knots and other small shorebirds by "fire-lighting"—

shining lanterns on flocks roosting on tidal flats at night, or setting hog lard alight in a skillet. Seizing the dazed birds, they bit their necks to kill them or beat them with a stick, then stuffed the dead and dying birds into barrels for sale in nearby markets. Sometimes the birds spoiled and the barrels were tossed. In time, fire-lighting gave way to shooting, decimating entire flocks in only a few shots. These practices, which nearly rendered the birds extinct, took place on Cape Cod's shores, where in 1912, Massachusetts ornithologist Edward Forbush wrote, "everybody shot the Knot, both fall and spring."

I see sadness in Essley's painting—birds in disarray, scattered, a trail of blood encircling the flock. And yet, in the painting's beauty, vibrant color, and potential flight of a bird in the lower right-hand corner, there is hope. International coalitions of biologists, conservation organizations, and government agencies are creating protected areas for shorebirds in the Guianas, requiring hunting licenses and enforcing hunting laws, providing park rangers with seaworthy boats and motors, and alerting schoolchildren and their parents to the plucky birds taking refuge in their countries.



TIERRA DEL FUEGO

RED KNOTS complete their journey from the Arctic on a long, lonely beach, Bahía Lomas, their largest, and possibly last, remaining home in Tierra del Fuego. Empty beach extends mile after mile, broken only by guanaco occasionally leaping the fencing of adjacent estancias, the only sound the sound of the wind. The tides and currents are treacherous. In 1520, Ferdinand Magellan sailed into the strait that would bear his name, his ships buffeted by wind and tide, his fearful men having mutinied. He arrived in October with the knots, pausing briefly at Bahía Lomas, where the birds stay four or five months.

Each day the birds come in with the tide, first appearing as tiny wisps of distant smoke, and then as giant clouds sailing over a tidal plain four miles wide, stretching all the way to the horizon. During long days, the birds follow tides, feeding on small clams in flats exposed by ebbing water.

Essley captures this rugged place at the far end of the earth: the steep Andes rising in the background; thick green forests edging the strait; rough waters and treacherous shoals; a big, yellow sun warming raw landscape, lighting both day and night during the austral summer.

Her painting speaks of loss, the striped bands and dots, according to Essley, evoking “body painting and bark hats of the indigenous Selk’nam” who lived along the strait for thousands of years before European settlers uprooted and extirpated them. Whether the birds too will disappear remains to be seen. One red knot, no longer in breeding plumage, appears on Essley’s beach, but mostly it’s full of pale shadows: one knot silhouetted against mountain, another fading into greenery, a flock blending into the beach. The ghosts of knots gone outnumber the living birds.

In 1985, Bahía Lomas was home to forty-two thousand red knots. In recent years their numbers have dwindled to as few as eleven thousand. In coming decades, global warming’s increasingly corrosive sea, already inimical to some organisms in high-latitude waters, may thin and slow the growth of shellfish here, giving the birds less than they need. Stresses along the rest of the flyway resonate here: the depleted horseshoe crabs, intense development and bulwarks at sea’s edge, and increasing human disturbance may be more than these birds can bear. For now, though, those remaining in Bahía Lomas will have a few months of peace before next year’s long journey north. ○

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