The Secret Life of Ponds

INSIDE THESE SHAPE-SHIFTING, PRIMITIVE WORLDS

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PHOTOGRAPHS BY ROBERT LUBECK

Water lily pads on a Limekiln Creek beaver pond. Facing Page: **White-tailed skimmer and green frog.**

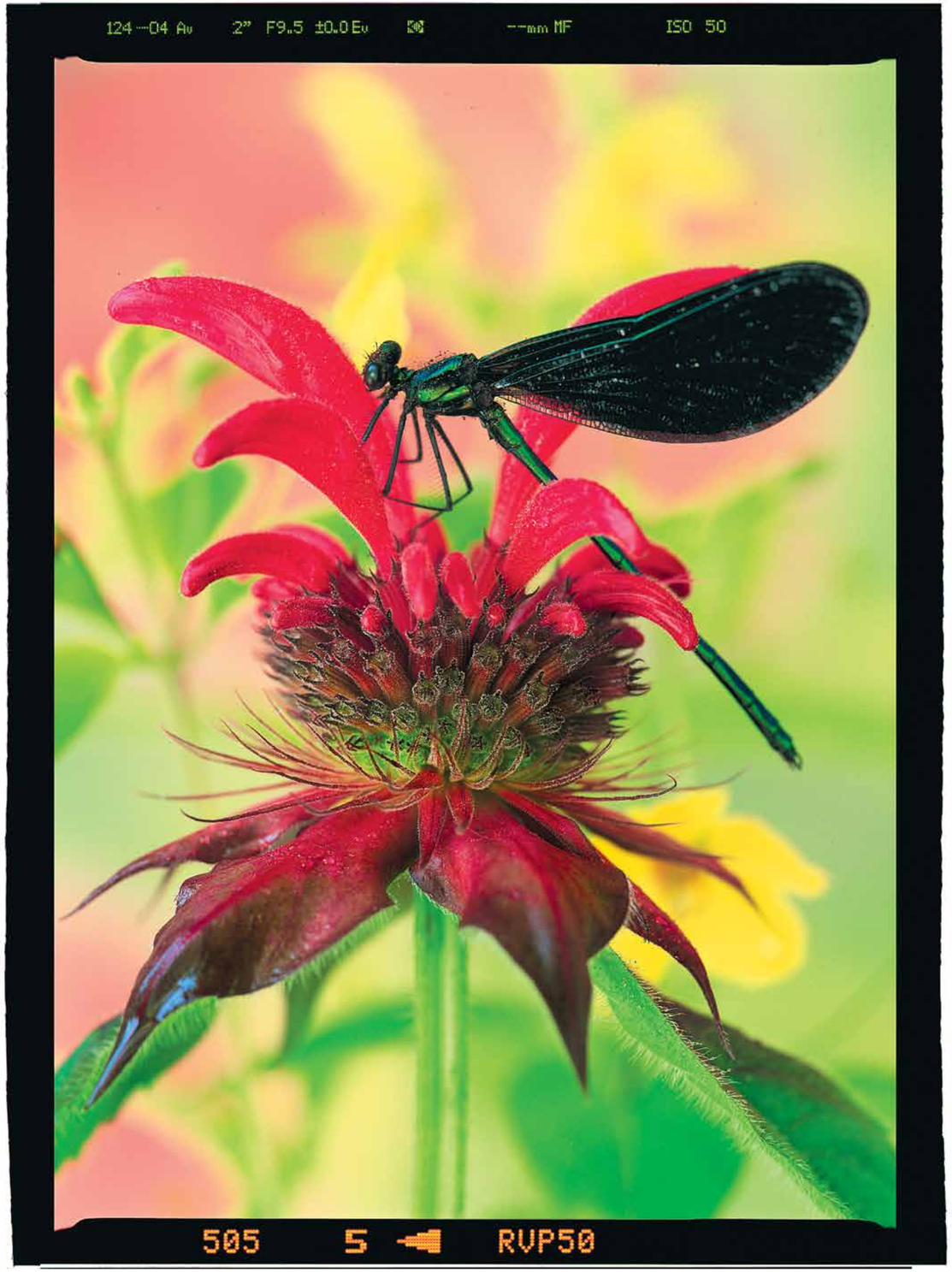
A pond can seem to be many things.

A fishing hole. A fallen piece of sky. A secret lair of magical beasts and ancestors. To some of us a pond might be a lake instead, because there is no consistent definition of those labels based on size, outflow or anything else other than personal preference: Follensby Pond is about the same size as Meacham Lake, for instance, and both have river outlets. What you see in a pond is largely a reflection of yourself, and as a scientist I tend to focus on species and ecological processes in the waters of the Adirondacks. But as a human being I also savor the mirrored colors that ripple and shift with winds and seasons, and I enjoy pondering the mysteries of life in and around waters that have stirred human imaginations through the ages.

Early Europeans populated their local water bodies with spirit-world sprites and Grendel monsters. For early native peoples of the North Country, it could be horned serpents or an underwater panther who whips up storms with his tail. Today, most of us pay more attention to the physical-world creatures that inhabit ponds, but if we study them closely we need not lose that old sense of wonder. Adirondack pond denizens can evoke mythic concepts of metamorphosis (meta-morpho, or "shape shifting") and amphibian transformations (amphi-bio, or "double life").

Consider the flying dragons. Scientists sometimes call dragonflies "primitive" because they closely resemble their Paleozoic ancestors, but don't be fooled. Antiquity is not necessarily simplicity, and living fossils were early winners in the ancient struggle for existence. Dragonflies are superb hunters, astonishingly agile as they dart after mosquitoes and other prey with a clatter of transparent wings. Those two pairs of wings can hover or hurl their wearers in six directions, including backward, at more than 30 miles per hour, faster than any other insect. The great bulbous eyes, so large that they press against one another in the center of the face, are globular clumps of thousands of smaller eyes that point in all directions as well. Visual raspberries, if you will. Think you're clever? Imagine being able to monitor several thousand individual camera-images simultaneously from every possible angle—above, below, forward, backward and sideways—and also to make accurate life-sustaining sense of it all.

Top to bottom: **Brook trout. Aquatic newt embryo.** Facing page: **Ebony jewelwing damsel on bee balm.**



Wood duck drake with marsh marigolds. Facing page: **Painted turtle.**

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The life stories of dragonflies are amazing. The graceful creatures that dart and hover and swoop before you are amphibious shape-shifters whose children live separately from their parents on the bottom of the pond. They will spend most of their lives down there, for months to years, depending on the species. An aquatic dragonfly nymph is wingless, stubby-looking—as though much of its midsection were removed—and voracious. Think mini-crocodile with prehensile jaws that can lunge forward quick as a flash, and you'll be glad that they aren't larger. Those killer nymphs live underwater so long that algae sometimes coat them like camouflaging weeds, and they can leap from cover toward food or away from danger by squirting jets of water from their backsides. They also respire through their rear ends. Can you do any of that? Thought not.

Notice how the slimmest blue fliers in the crowd hold their wings folded upright over their bodies at rest, rather than flat astride the thorax like airplane wings. Those are damselflies, another clan of shape-shifting hunters, whose former aquatic selves were also sleeker than their dragon-cousins and tufted with gills that resemble tail feathers. You may see dragon or damsel couples doubling up to fly together in mating loops. Each loop is a male clasping his mate by the back of the neck with the fingered tip of his abdomen while she reaches forward from below with her own abdomen to extract his genetic seeds from a cleft in his chest.

A few weeks before it dies, the nymph of a dragon or damsel climbs a plant stem, boulder or dock piling to cross over into the rarefied air of our own world. Having thus ascended heavenward, a nymph is transformed. Within the husk of its former self, it disaggregates into a slurry of cells that rearrange themselves into a new body, all without extinguishing the flame of life. The increasingly brittle husk stands like a hollow statue—you might later find it

fixed in place—then splits down the back. Slowly, leg by leg, antenna by antenna, wing by soggy, crinkled wing, out comes an insect angel. Or rather, a hungry death-angel with a taste for bug-meat that will end many a tiny life before its own lifetime runs out by summer's end.

Insects, of course, are not the only shape-shifters and double-lifers to cross between realms. A sharp-eyed frog snags small fliers after having survived for months as a tasty tadpole among hungry water bugs and fish. A wriggly red-spotted newt also begins life in the water as a tadpole-larva with tufted gills on its neck, which puts it into the same biological class, Amphibia, because of the dramatic metamorphosis of larva into adult. As it matures, it clambers ashore and wanders the surrounding woods as a slow-moving, air-breathing, orange-red eft. About the size of your pinky and easy to mistake for a child's plastic toy on a forest path, an eft is not as defenseless as it seems. Its skin packs a chemical wallop that keeps most predators at bay, the same nerve-jamming tetrodotoxin found in pufferfish, from which the potentially deadly Japanese dish *fugu* is made. An eft is harmless if you pick it up for a closer look, but not if you see it as local *fugu* and decide to swallow it. After several years under the protection of its bright warning colors and chemical defenses, the woodland eft returns to the water as a green aquatic salamander, though it keeps a toehold on both worlds. Retaining the lungs, the reddish-spotted flanks and some of the toxicity from its former eft-self, it swims among new crops of tadpole-larvae.

A painted turtle may share a North Country pond with a big old snapper, but it also enjoys basking in warm sunlight atop a floating log. Both species crawl ashore to lay their Ping-Pong ball eggs in sandy nests in spring, one of the traits that exclude such reptiles from the frog-salamander class despite their amphibious lifestyle. Although they have lungs and normally rise to the surface every half hour to breathe, when winter paves the pond with ice they can survive several months underwater without the aid of lungs or gills. They slow their metabolism down to a torpid state while resting in soft mud and respire through the linings of their mouths and throats. Turtles are also sometimes seen through thin, clear ice, lumbering slowly on the bottom as they await the coming thaw.

At the surface, beneath the ice, in the mud—there's so much to ponder, including our own origins in a water world. We, too, are amphibious shape-shifters, beginning life as something akin to a protist in the dark, warm pond of the womb. Each of us developed a tail and the progenitors of gills according to the genetic traditions of water-dwelling ancestors, then resorbed them like tadpoles before leaving our amniotic pool. We emerge into the world of air as smaller, simpler and softer beings than what we become in our later years. In the liquid mirror of Adirondack waters, we can see ourselves.

Top to bottom: **Salamander. Basking juvenile snapping turtle, Muskrat Pond, Moose River Plains Recreation Area.** Facing page: **Green frog and lily pads.**