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Caroline Ailanthus

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Monadnock: What Changes, and What Doesn't

Supporting a Mountain as It Changes

People, climate, and the absence of trees

Caroline Ailanthus



Editor's note: A science writer offers another view of the mountain everybody loves: its landscape tells the story of climate change and calamity.

ECOLOGY IS A PROCESS, NOT AN HEIRLOOM. IF YOU DON'T UNDERSTAND that, go for a walk on Mount Monadnock with a forester.

Monadnock is the mountain you can see on a clear day from pretty much anywhere in southwestern New Hampshire. It's a big, solitary dome set in otherwise low, rolling country; if the land were a ship, the mountain would be its mast. The summit is open and rocky, the views are amazing, the trails are mostly fairly easy, and the trailheads are a few hours' drive from pretty much anywhere. Not surprisingly, Monadnock is the second-most climbed mountain in the world, after Mount Fuji, in Japan.

The forester will probably have some connection to Dr. Peter Palmiotto, director of the conservation biology concentration at Antioch University New England in Keene, New Hampshire. He founded and directs the Monadnock Ecological Research and Education Project, or MERE. If Mount Monadnock is a ship's mast, MERE is the crow's nest from which Palmiotto and his students and colleagues are watching climate change.

Monadnock is a good place to watch the process of climate change across time because of the way mountains alter climate change across space. We are used to climate change across space; Florida does not have the same climate as Maine, nor does it grow the same trees. If the climate of Florida moved to Virginia (as it may well do before the century is out, barring a miracle), the trees of Florida would follow. A complicating factor is the speed of human-caused warming; most tree species will not be able to keep up, so Florida forests will not simply shift north altogether. Forest compositions will likely be reshuffled in the coming decades. But if you could keep track of all the trees in the country over a long enough period, you could watch the different kinds of trees surging south and then north again over the centuries like the wrack lines of some giant, green tide.

If you want to keep an eye on the tide without running transects across hundreds of miles of North America, you can see the same shift in climate

Picturing change: trees once grew on this spot on rocky Mount Monadnock in Jaffrey, New Hampshire, and trees could grow here again. JERRY AND MARCY MONKMAN/ECOPHOTOGRAPHY

and trees by climbing a good-sized mountain. Mountains foreshorten forest zones because a few hundred feet of elevation changes climate the same way hundreds of miles of latitude does. Start at the base of Mount Monadnock on a fine day in late fall (after the leaves are off, so you can beat the crowds) and you stand among red oaks, white pines, and hemlocks—pretty typical of the woods in southern New Hampshire. Walk uphill, and you climb into forests of red spruce, a plant you might otherwise have to go to Canada or Maine to find. If you are walking with a forester, you might stop at one of the permanent study plots MERE has established on the mountain so you can see how the trees are doing this year. Growing fast or slow? Living or dying? Sprouting up with happy little red sprucelings, or the first, bold oaks? It's not so much that red spruces like the cold, but that they dislike the cold less than the oaks do. Without the cold to reserve a space for them, the spruces can't compete, and they'll give ground, retreating up the mountain—until they run out of mountain. This is important, because as go the spruces of Monadnock, so go the spruces of Maine and Canada, and so go all the animals and other plants that make up the boreal forest. So how are the spruces doing today? The forester doesn't know.

I have climbed Mount Monadnock, though not with a forester. Today I stayed home and spoke with Palmiotto by telephone. I'd heard about the issue with the spruces before (I am an unrepentant plant geek), but what I didn't understand is why MERE is also looking for changes in subalpine plant communities on the summit. Generally, yes, a mountain can poke up into the alpine zone just as Monadnock pokes up into the spruce forest. Such a pokey mountain will sport a spot of tundra on its tip. Just as the spruces need the cold to keep the oaks at bay, so do the sedges and little heaths and cushion plants need the cold to keep at bay the spruce. Climate change means the alpine communities, too, will head upslope until they finally run out of mountain.

But Monadnock is not actually that high. It is not tall enough to have tundra normally, and until 1800 or so, the whole mountain was forested. In that year, there was a fire, and twenty years later, there was another one. Between them, the two fires denuded the upper cone of the mountain, and without the trees, most of the soil washed away. What is climate to the little subalpine plants, since it was fire, not climate, that created the opportunity for them?

Palmiotto explains that these plants are vulnerable, not so much to changes in temperature, but to changes in moisture. With hotter summers will come

drought, and that may be more of a problem than the warming itself. But the issue of whether the subalpine plants are actually in “their” climate touches a nerve. Apparently, some people are wondering why MERE’s alpine stewards are working so hard to protect plant communities that are in the wrong spot. Why try to restore a mountain that isn’t in its natural state anyway?

This is what I meant when I said ecology is a process, not an heirloom. The beautifully engraved chest of drawers your Great Aunt Jo gave you derives its value from how close it is to its original condition. It’s a piece of history. The glittery unicorn stickers you added when you were 10 didn’t help. But Mount Monadnock is less like that chest of drawers and much more like Great Aunt Jo herself—with living beings, the point isn’t to preserve the original condition; the point is to protect and support the processes of their lives.

Plants don’t grow where they are supposed to; they grow where they can. Though taller mountaintops and polar sweeps have the right conditions for tundra plants more consistently than Monadnock does, there is no wrong place to be a plant. As Palmiotto explains, the exposed summit of Monadnock is, at present, a bad place for trees. The little subalpine plants and lichens cope with the wind much better; therefore, it *is* the right place for them now. Should the trees get a chance to come in, the growing shrubs and saplings will provide shelter for each other and conditions will change. The point is not to



Forest succession has been thwarted by feet. JERRY AND MARCY MONKMAN/ECOPHOTOGRAPHY

prevent change, to turn back the clock to some more pristine era; the point is to support the integrity of the mountain's own processes as it changes.

"My whole goal is to monitor change over time, educate people about change, and maybe, give the parts of the mountain that can revegetate the chance to do so," Palmiotto says. The trajectory of revegetation can probably be predicted, based on our knowledge of succession and species, but we haven't predicted it yet. But if those plants just get stepped on . . . there'll be no opportunity to study succession if everything just gets crushed."

Getting stepped on is a serious possibility on the summit. Remember that Monadnock is the second-most climbed mountain in the world. In 2009, the busiest 24 days of the year saw 16,111 visitors; that's 32,222 feet! That's a lot of footprints, especially for small plants and lichens not adapted to any human foot traffic at all. I ask what Monadnock would look like now if hardly anyone had hiked on it since the fires. Would the summit be closer to being reforested?

"Oh yeah, a lot closer, a lot more forested," Palmiotto replies immediately. All his other answers have come slowly, careful as the growth of trees. This one tumbles out like water leaps off rock, tinged, suddenly, with something like nostalgia for a forest that does not yet exist and that Palmiotto, being merely human, cannot now hope to live to see.

"The gravelly patches and grassy areas would be shrubs and small trees. People would look at the summit and think it was forested; the trees would be tall enough to hide the summit cone, but just not on the bare rocks . . . like a lot of areas that are sparsely forested, with a lot of bare rock underneath. But the places that could hold seeds, that could support germination, have been stomped on. The trees haven't had a chance. There are some patches of shrubland already—you can see in aerial photos. But succession has been thwarted, halted, arrested by human trampling—so I will claim."

The young forest, which would exist but for 190 years of trampling, blossoms in my mind. I have been to the top of Monadnock, sheltered from the whipping sky behind big gray blocks of bare stone, and crawled carefully along ridges of rock to harvest scraps of candy wrapper from pools of chilly water. I can place myself there with a thought. Now, young shrubs and trees sprout from the grassy hollows in my mind, spill out from sheltered crevices, and gain the height of my head and keep going. Spruce limbs meet and cross like reaching fingers over me and my rock. The stone beneath my fingers, also protected from feet, scales itself with lichen, little discs, green and brown like

leather coins. If MERE has stopped the trampling with its education efforts, the clock of succession that was stopped by feet will move forward again. The new forest will come—in about 180 years.

In 180 years, the climate will have changed—how much depends on human choices now, but the climate is still adjusting to the pollution already up there. Some further warming is inevitable. By then, the spruce could be gone from Monadnock, chased upslope by oaks. That the upper few hundred feet of mountain will not grow trees in the coming decades means the spruce will run out of mountain that much sooner.

Palmiotto does not say this. It's true I did not ask, and he does not have much time today for chitchat, but what comes across is not dread of the future but curiosity about it. MERE is too young a project to have much in the way of results yet. Let the rest of us issue warnings. There is certainly plenty to warn about; global climate change is real, and we are in trouble. But science never arrives; it never runs out of questions. Take a walk with a forester, and your companion will listen more often than speak, watch more often than perform. If we and the forests are all moving, at least someone is up in the crow's nest watching where we go.

CAROLINE AILANTHUS is a Maryland-based science writer and novelist. This essay first appeared on her blog, *The Climate in Emergency*.