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# MELTDOWN

Glaciers are supposed to advance  
or retreat at a glacial pace.  
Now they're disappearing before our eyes.

By Robert Kunzig

**G**laciers are wild beasts. Back in our pre-industrial days we feared them like wolves—except glaciers ate whole villages. By the late 19th century they'd become tourist attractions; in Switzerland you could venture into the belly of the Rhône Glacier through a tunnel dug each summer next to the Hotel Belvedere. By then we had also begun creating a world that may one day have no room for glaciers. But for now, beasts they remain.

**They breathe.** Snow stacks up to become ice in the upper altitudes of a glacier; it melts down near the snout. "The glacier breathes in in winter, then breathes out in summer," says Matthias Huss, a young glaciologist at the University of Fribourg in Switzerland. In August a quarter of the water flowing in the Rhône River comes from melting glaciers.

**They move.** When enough ice weighs down on it, ice itself can flow. "When it's not moving, it's stagnant ice—it's not a glacier," says Dan Fagre, pointing at a shriveled white patch in Montana's Glacier National Park. He has worked there for two decades as a climate change ecologist. There are 25 active glaciers in the park, but a century ago there were 150. Many disappeared before they could be put on a map. We know them by their moraines—the piles of rubble they plowed up as they slid downhill, back when they were alive and moving.

**They rule(d).** Twenty thousand years ago Switzerland was a sea of ice; only the high Alps protruded as wind-shattered islands. In the 19th century the remnants of this Ice Age surged a bit, at the end of what's now called the Little Ice Age. An 1849 daguerreotype shows the snout of the Rhône Glacier extending about 1,700 vertical

feet lower than it does now. It fell down a steep escarpment, its ice crags suffused with blue light, and crept along the valley floor like a frozen amoeba. An amoeba several stories high.

Daring to rub shoulders with such monsters during the Little Ice Age is what allowed Swiss scientists to realize—from moraines and other tracks high in the mountains—that big ice ages once happened. It's how we learned that Earth's climate can change profoundly. If we weren't changing it now ourselves, if nature were still in control, we'd be due for another ice age in a millennium or two. Conversely, if we burn all the coal, oil, and gas still underground, we'll melt every last speck of ice on Earth. Glaciers remind us: We're at an interesting fork in the road.

**They struggle.** As the world warms, a glacier seeks balance: an altitude and a mass at which snow added above equals ice melted below. "It struggles to adapt, but it's not that easy," Huss says. Weather is local, the struggle is individual, and so a few glaciers on Earth are still advancing—but only a few, and none in the Alps. Half the ice there has melted in the past century, enough to fill all the lakes in Switzerland. Eighty to 90 percent of what's left, Huss predicts, will be gone by 2100.

The Rhône Glacier has retreated up the mountain, out of sight from the valley. It ends now just above the Hotel Belvedere, and in summer you can still walk into it. To see it in winter, when it's alone and in its element and the road to the hotel is closed, you have to snowshoe up a mountain. From there, as crows circle above and snow swirls around you, the beast will be at your feet: an undulating white serpent, hauntingly quiet. But also breathing hard.

Glacier Park will still be beautiful without the glaciers, Fagre says. Switzerland too, says Huss, but he adds: "For me, it hurts to see at the end of the summer that all the snow has melted and they're just losing mass. It hurts." □

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Robert Kunzig is the magazine's senior editor for environment. See more of James Balog's *Extreme Ice Survey* at [extremeicesurvey.org](http://extremeicesurvey.org).