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# How to Measure a Coastline

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The shore of Lake Superior is infinite. This is not a metaphor.

I am standing on the lake's rocky beach, and the cliffs of Black Rocks rise above me. I haven't been here since some time before I was fourteen maybe thirteen because the last time I was in the U.P. I was fourteen maybe thirteen, and who knows if I came to Black Rocks then? I should know but those are the kinds of memories I bury beneath sand so unlike the stones beneath my feet. It's a cold spring day, and I'm not wearing my heavy winter coat because I've forgotten that the land is not as welcoming here. The wind grabs the chill of the evercold Lake Superior and blows it in my face, leaving it raw and red and numb.

If you fit a trapezoid over the area of the lake, you can calculate the shoreline easily enough: just add up the lengths of the four sides. (There is no easy formula, not like  $2\pi r$  for a circle or  $4s$  where  $s$  is the length of one of the sides of a square.) But anyone can see just how inaccurate this trapezoid would be. So try to make the sides shorter. Maybe ten of them instead of four? Or 100? 1000? While the length of each side would decrease, the number would increase such that the sum of these lengths would grow and grow and grow and grow.

I look down at my feet. There is no sand on the shore here. In the summer, there is no soft sand beneath your feet: you must scramble over rocks and hope the calluses on your feet are hard enough to withstand it all. It makes me feel like humans are much weaker than they used to be. I wince at uneven terrain where my ancestors would have relished it. Every time I leave this shore, I leave with pockets full of interesting stones, but I never keep them. I wonder where they go, because I've never consciously thrown one in the trash, in the wilderness, in my yard, even into the hands of a friend. I hope that these calculi roll out of my possession and back to nature, find the solid earth beneath their rocky selves and are content.

According to the calculus, we should be able to measure a curve perfectly with an infinite number of small line segments. Take the limit. That's the length of the coastline. But that's asking us to take math out of its strange Platonic sphere and bring it here,

on the shore of Lake Superior, a place that belongs to my dark alternate universe self and yet also belongs to my current self, and I wonder if this beach is a space between worlds. If I turn around, will I see myself, standing there, looking out at the water, wondering where all the stolen rocks have gone? Maybe we can't measure the coastline because the coastline is not just here, on the shore of Lake Superior, in the shadow of the black cliffs; maybe we can't measure it because the coastline has moved, has been stolen, has found itself in different places across the world. We can't measure what we can't locate, and I suppose we can't locate what we can't measure.

I turn around, and I do not see myself. But maybe she, my double my doppelgänger my twin my self, maybe she stepped forward at the moment I was turning and we have missed each other once again as we always do. The rocks scrape past each other as I walk up the beach, and it sounds like they crunch: imagine if I were large enough strong enough to break stone with merely my footsteps, and I almost wish it were true. I walk up the beach, a hill, one of the few in Michigan, 'til I get to the trees and then I turn left. The path here is like a set of stairs where tree roots are the steps. Just a few through the trees, up and up and up, and then the trees end and I am on top of the cliffs and not below.

I've seen the ocean before, once or twice, whichever one is on the east coast. I was not impressed. This impresses me: like the ocean, it goes on and on without end. But it is contained, I don't know any other way to say it; the ocean feels like something that the land is in, but this lake is something that is in land. Tame. I look out at the whitecaps and I take back that word, because Lake Superior, wolf-shaped and wolf-spirited, can never be called anything but wild. She has wrecked ships, killed men, she cannot belong to anything but herself. I hope to be like her one day. It's this wildness that stops her from being measured.