

“From our boots to our bicuspid, we Albertans are way into mud.”



*It's Bud the Spud from  
the bright red mud/  
Rollin' down the high-  
way smilin'*

Whoa, whoa!

Stompin' Tom's song is about P.E.I., not Alberta. But what the heck, when it comes to mud, our province really shines. Glistens. Slurps and slumps and slips and slides with the best of them.

Soon as the spring melt exposes the ground under the snow, we're into mud season. Lasts about a month. Water pools up in the top few centimetres and turns the soil into soup. Watch your step!

Especially in and around Grande Prairie, the mud capital of Alberta. The whole region once sat at the bottom of a lake dammed up by glacial ice, and lakes are famous for collecting mud—as will your boots in any bare field in Peace River country in April. Who needs to hit the malls for the latest in thick-soled fashion? Nature can supply.

But what exactly is mud? Geologically, any gloppy sediment made mostly of particles less than .062 millimetres across (that's right: not .060 or .065; gotta be .062 mm) can be thought of as mud. Harden that up and you have mudstone, which most people call shale. Not correct. Shale is made of much smaller particles, ones referred to as *clay-sized*. More on that in a minute.

Silt is a variety of mud in which the particles are—ready for this?—between .0039 (not .0040, nosiree) and .062 mm. Silt is the favourite water-muddier of rivers, which carry it along and dump it into lakes. So the stuff that cakes underfoot around Grande Prairie is mostly silt. Harden up silt and you get, of course, siltstone. Isn't geology easy?

Wait; there's more, lots more to this. You need to consider where all

these itty bitty particles have come from. A lot of them are just tiny grains of sand. But that's too obvious. Scientists live for the obscure and the difficult. Which brings up the topic of clay minerals.

There's clay and then there's clay. You can have clay that's full of tiny quartz bits, ho hum, and you can have clay that's made of weird compounds formed by the chemical breakdown of feldspar, hornblende, mica and so on into minerals such as montmorillonite, chemical formula  $Al_2Si_4O_{10}(OH)_2 \cdot nH_2O$ .



Yow! Enough, already! But never mind; here's the thing: water gets into the platy crystal structure of clay minerals, swelling them up and making them very slippery. When clay minerals dry out, what they want in the worst way is more water. So they sop up whatever liquids they can find.

My favourite of these water-soppers is bentonite (add “-ite” to the end of any word and you have a mineral). Bentonite is amazing stuff. It started as rock dust blasted out of volcanoes in huge, Mount St. Helens-style explosions along the west coast back in the Cretaceous. This dust settled all over western Canada, weathered into montmorillonite and got carried eastward by ancient rivers toward what was the ultimate prairie lake at that time—an inland sea. Into that sea, in whose shallows dinosaurs waded, went layer after layer of montmorillonite

clay. It hardened just a little, becoming bentonite shale. The southern Alberta badlands are carved in that shale.

This is the material that makes badlands surfaces nicely crunchy when dry, providing good footing as you work your way up some 40-metre-high hoodoo. Then the rain starts, and the slope turns impossibly slippery. Same thing when you're driving one of those narrow dirt roads out on the Kainai Reserve south of Lethbridge. It's bad enough having to leave the car in the ditch; the real embarrassment is to fall down every 10 steps on flat ground while you're trying to walk home.

But the oil business loves bentonite. Cheap and plentiful, it gets pumped down-hole through the string of drill pipe to the very bottom, where the bit is grinding away. Up come the rock chips in the space between the walls of the hole and the pipe, carried along in the superb flowing gel that bentonite makes when mixed perfectly with water.

And there's another industry that loves bentonite, too. This one produces a product nearly all of us use every day, in our mouths. Yes, bentonite is found in most brands of toothpaste. Recall the gel property? Recall the ads we've all heard? “Gentle polishing action whitens your teeth!” as tiny crystals of montmorillonite grind away on your molars. Consider those dinosaurs mucking about in bentonite, and the fact that every speck of it has been through at least one of them...

So there you have it. From our boots to our bicuspid, we Albertans are way into mud. I think we need a special day on which to celebrate this. You heard it here first: let Ralph proclaim “Muddy Monday” with a big parade in Grande Prairie. On an unpaved street. We could invite Stompin' Tom.

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