## Geology Seen Along the Trans-Canada Highway from Calgary, Alberta, to Golden, British Columbia 2010 By Ben Gadd

The word "PechaKucha" (Peh-CHAW-kuh-chaw) is Japanese for "chit chat." You show 20 interesting slides in 20 minutes, the projector running on auto and you narrate the show live.

In 2010 I was invited to do a PechaKucha talk. It was a no-charge outdoor event on July 16<sup>th</sup> at Olympic Plaza on the mall in downtown Calgary. The hat was passed to raise funds for the PechaKucha organization, which exists to put on these talks.

I knew the images in the talk very well, so I didn't need notes to mention the interesting aspect of each, but I have gone back and added brief comments in case someone else wants to show them.

View west from Calgary to the mountain front.

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Easternmost Rockies thrust fault seen along the highway, exposed in a cut through a foothills ridge. The fault angles up and steeply leftward from about the position of the front of the car.



Drumlin on Morley Flats. Ice flow was from left to right, which is to say west to east.

Yamnuska ["Yam-NUSS-ka"], not "Mt. Yamnuska" or "Yamnuska Mountain," just Yamnuska. "Yamnuska" is the clumsy rendering in English of Îyâmnathka ["Ee-yam-NATH-ka"], which is a Sioux word—the local Stoneys are Sioux—meaning "flat-faced mountain."

The Automation

Close-up of the McConnell Thrust, a major Rockies fault, at the base of the cliff on Yamnuska. The pole points to the trace of the fault, which is horizontal.

The limestone above my pole is middle Cambrian in age, 525 million years, while the shale below my pole is late Cretaceous, 75 million. The fault has sent the older rock sliding to the right some 40 kilometres over the much younger rock.

Start Start of Starts



Lac Des Arcs panorama. That's a cement plant on the other side.



Lac Des Arcs panorama annotated with the geology. The dashed lines are thrust faults.

## **The Three Sisters**

Same layer of Devonian limestone

Geology of the Three Sisters at Canmore. Note how the rock of the lower sister is folded over like an omelette, and how the same layer repeats.

2789 m



Tunnel Mountain, which is a roche moutonnée ["rosh moo-tun-EH"], meaning a bedrock hill sitting in the middle of a glaciated valley, a place in which you'd think the ice would have ground it away. But not so. And no one knows why that is. Slabs on Mount Cory just west of Banff. The Devonian limestone is steeply tilted down toward the left, which is to the southwest, typical of the front ranges.



Castle Mountain, famous for its two cliffs of flat-lying middle Cambrian limestone and dolostone, with a thin layer of shale between them.

Saddle Mountain near Lake Louise. A lot of people know it as "The Saddleback," but that's not the official name.

The rock in the cliff is early Cambrian quartzite about 550 million years old. The cliff itself was carved out by glaciers during the ice ages. That's Mount Aberdeen on the left and Fairview Mountain on the right.

Mount Victoria, with the Upper Victoria Glacier draped over a wide bedrock bench of that early Cambrian quartzite. Middle-Cambrian limestone has been glaciated away above the quartzite. The steep slope of Mount Victoria has been cut into more mid-Cambrian limestone, with shale at the base.



Slate, which is shale hardened by heat and pressure, at the turnoff for Jasper. This is the oldest rock in the area, about 740 million years.

The Kicking Horse Mine as seen across the highway from Field. Ore containing lead and zinc was moved down to the railway by tramline. The mine operated between 1888 and 1952.



The rock in Mount Stephen, on the left, is limestone, while the rock in Mount Dennis, on the right, is slate. Yet both were laid down at roughly the same time in the middle Cambrian about 525 million years ago. Geologists call this a facies ["FACE-ees"] change.

And here is *Anomalocaris,* the apex predator of the seas at that time. Fossils of its spiky appendages and its strange mouth are found in the Burgess Shale around Field. Drawing courtesy of the Burgess Shale Foundation.

Kicking Horse Canyon in 2023. BC government photo.

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Layers of limy tufa ["TOO-fah"] and the mineral springs that have deposited it seen right beside the TransCanada Highway in Kicking Horse Canyon.



The Rocky Mountain Trench near Golden, BC. Rockies on the right, Columbia Mountains on the left. This valley is one of the world's great physiographic features, 1550 kilometres long, and it's easily visible from space. But contrary to what you may read elsewhere, it is not obvious from the moon, nor did any of NASA's lunar astronauts remark about it. Photo courtesy Explore BC.

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