McGlashan Lake Petrified Forest

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(Part One originally appeared in the Kamloops Daily News on Dec 9 2000, Part Two on Dec 16, 2000)

Part One

It's a struggle to find the trail now. Ten years ago it was faint at best, but after Riverside Forest Product's harvesting activities, and the blow-down of spruce on the edges adjacent to the clear-cut, it is now a task of trial and error. Finally, though, younger eyes prevail and slight smudges of trail and familiar landmarks are recognized. The small party of hikers slowly makes it's way up through dark stands of old growth fir, pine and spruce, skirts the sides of swamps and seeps and Devil's Club, and occasionally breaks out into sunny bright green stands of aspen. Spring mushrooms play hide and seek in the leaf litter, and a great grey owl silently launches itself between the white trunks of the aspens to slip away ahead of the party. The quiet is absolute and time seems to be a tangible presence sitting on their shoulders.

The hikers are on a trip in to the Petrified Forest in the Campbell Range west of McGlashan Lake. Under the canopy of the trees the ground seems to be have been excavated and backfilled long ago as mounds, hummocks and depressions undulate back into the gloom and down-slope from the trail. Now covered with grass and bushes and with trees well established, it is obvious that this disturbance has considerable age.

The area which contains the Petrified Forest is now protected, and is an island surrounded by tree harvesting and forest resource road building activity. Logging has gone on in this high country since the Fifties, and before. Pine and fir was harvested for apple boxes to feed the requirements of Okanagan Valley orchardists, and these activities created roads throughout this area of the Interior Plateau. These roads provided some of the first access into what we now call the Petrified Forest.

After an hour of moderate hiking, the party broke over onto a broad flat and found itself in a clearing lightly populated with fir, aspen and cottonwood. Some of the cottonwood had carvings of the names and dates of previous visitors. While not many are noticed from the recent past, a number of them are from the thirties and forties; the earliest being 1931. In this clearing are the now familiar jumble of what seemed to be boulders and rock outcrops. The observer's first impression is that the area had been blown up with dynamite, but no drill holes are visible. Within this debris was the party's first sighting of petrified wood. Greg Reid, a Geological Engineer with Golder Associates and an old Scouter in Kamloops, found himself staring at a length of petrified log one metre in diameter thrusting out from below the jumbled rock mounds. Scattered about the area were other examples, some hidden under moss and forest debris, and others lying on the surface and exposed to wondering eyes.

The petrified wood is a pale buff in colour with shades of pink and brown, and growth rings are readily apparent. Rarer specimens include sections of fossilized bark and pitch. Carbonized evidence on all the fossilized wood shows that this primeval forest must have been exposed to fire sometime in it's existence. Unsubstantiated reports mention that the trees were redwoods

or sequoia and that they dated back from 2 to 10 million years. Greg was non-committal, and merely mumbled under his breath.

The party continues on past these first outcrops to be faced with a vertical wall ahead of them at a slope of over 60 degrees and extending vertically at least 100 metres. Mosses, currant bushes and tilting trees cover an unstable wall which is scaled carefully and with both hands and feet used to maintain balance and to still make way up the face. Above them loom rock outcrops like hoodoos, perhaps ready to collapse at the slightest sound or disturbance. Finally, at the top of the slope, the party is confronted with pits, gashes and ridges of dramatic pink and buff rock outcrops.

Kirsten Grauer, Travis Karst and Greg Reid with petrified wood

The major feature observed is a crevasse up to 30 metres deep, 100 metres across and extending almost a half kilometer in both directions. Greg Reid, our resident geologist and time specialist, is now lost to us as we hear the woodpecker-like tapping of his geologist's hammer gleefully investigating rock outcrops, layers of volcanic tuff and other unique geological features. This is what he spent all those years studying for, the irresistible desire to be a rock detective and try to piece together activities that took place perhaps millions of years ago. We are content to munch on our lunches and wait for his final report.

Unstable Rock formations towards the top of the slide

Millie Portman of Kamloops and her late husband Jack were active members of the Thompson Valley Rock Club in the 1950s and 1960s. Jack served as President at various times. Now in her early 80s, it is Millie's recollection that it was in the late years of the Sixties that Howard Pearson of the rock shop in Monte Creek took her and Jack in to the Petrified Forest for the first time. Then, as now, considerable hiking was involved in gaining access to the site. Also, it was during the early 1970s that Jack received a call from a rancher in the Campbell Range telling him that an aspiring entrepreneur had started to harvest the fossilized logs in this forest for shipment to the United States and for sale to rock and gem enthusiasts. As a member of the Rock Club, Jack reported this to the Forest Service and the site was subsequently put under protection, leaving it for the enjoyment of future generations.

The “stone boat” that was used to haul out the specimens by draft horse was still extant when the writer and Roger Foreman, then leaders of the First Barnhartvale Scout Troop, spent a number of days with the Troop trying to find the location of the site in the early 1980s.

Slight clues to the forest’s location were noted in a signed early copy of Roland Neave’s “Hiking the High Points” published in the 1960s and inherited by the writer from his mother. Roland mentions in later editions that the Kamloops Outdoor Club ventured in to the site in 1971 to find only remnants of the logs that had previously being lying scattered about and open to view. With it’s appropriate psychedelic mauve and magenta mimeographed maps, Roland’s book was suitably vague about the exact location of the site, and it was only through extended but enjoyable explorations that the stone boat and eventually the location of the trail was found. The stone boat is unfortunately no more, having fallen victim to the tracks of a crawler tractor during harvesting operations. Only some iron rod and weathered and shaped timbers remain to mark what remains of this sentinel to the approach route.

Greg takes a break from his incessant pecking, and we ask him what happened here. He mumbles something about “millions and millions”, “volcanic eruptions”, “last glaciation”, “seeps” and other non-committal phrases and geologic jargon. He expresses the desire to go to the bottom of the slope of jumbled rock and hummocks for more investigation. The trip down goes quickly, and we find ourselves strolling along the toe of a cut slope formed by recent road building, and directly below the geological features we had just been observing, but perhaps a kilometer away as the crow flies. Greg reaches into the debris embedded in the slope, and splits a rock with his hammer. There, seeing the light of day for the first time in eons, and as the weight of time washes over the group, are fossils of sedges, mosses, grasses, and pieces of wood debris. But they are all jumbled, as if being run through a giant electric mixer.

“Aha!”’ Greg exclaims, (or some such suitably geologic expression) “I think I have a theory of what may have happened here.” We all gather round on the closest rocks and boulders, and pay rapt attention as his enthusiasm is imparted to us all while he explains his theory of the complicated geology and happenings of 50 to 60 million years ago to the present.

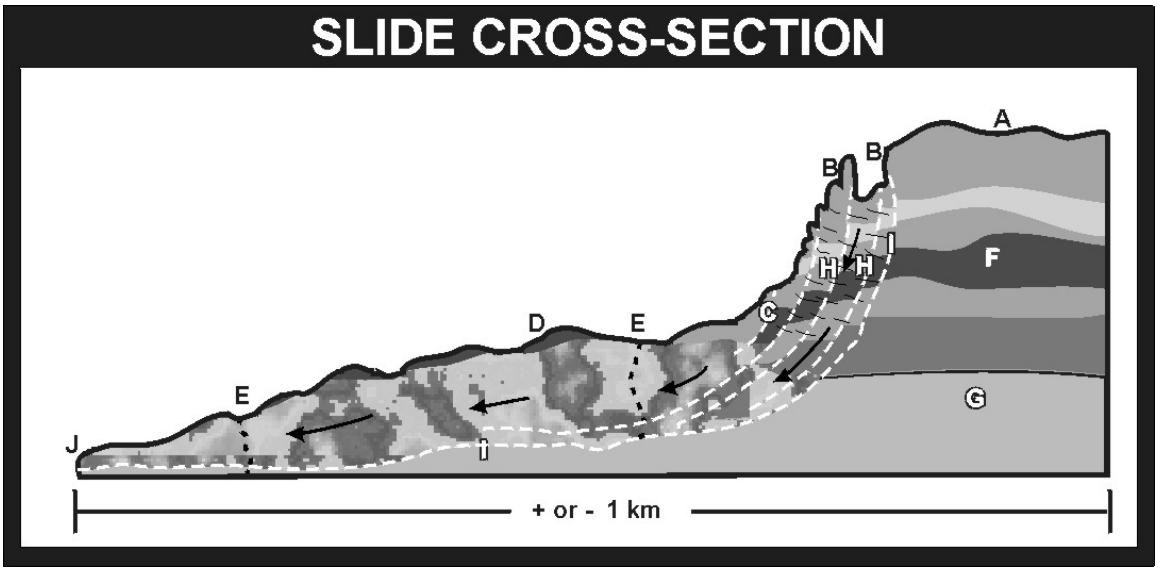
The McGlashan Slide and the Petrified Forest
Part Two

Greg Reid, a Geological Engineer with Golder Associates in Kamloops, accompanied a party of hikers into the Petrified Forest south-east of Barnhartvale in the spring of 2000. In last week's Spotlight we learned some of the recent history and the appearance of the site, now it is Greg's turn to advise us of his best interpretation as to the ancient history and geology of the site. Accompanying him in the party were the writer Peter Grauer, Kirsten Grauer and Dale and Travis Karst.

The Hiking Party; left to right; Dale Karst, Greg Reid, Peter Grauer and Kirsten Grauer

It all started in the Eocene Age, 50 to 60 million years ago, and is reflective of the scenario at that time around much of the Kamloops area. A great forest of coniferous trees, possibly redwood or sequoia, grows where we find the Petrified Forest today. Volcanism is active and the forest succumbs to fire and is quickly covered by volcanic ash from the volcanic eruptions. The ash, in turn, is covered by subsequent layers of lava flows and more ash. Much time passes, during which sediments turn to rock, and the tree trunks and other debris and fragments of ferns and grasses turn to rock, the process of fossilization.

In the most recent glacial epoch, the Fraser Glaciation, glaciers advance and retreat over the site of the Petrified Forest. Water pressures in the clayey ash from the ancient volcanic eruptions increase after de-glaciation. The original slope of the land over the Petrified Forest, possibly steepened by the passage of the ice sheet, begins to develop tension cracks at and behind the crest of the slope as the strength of the bedrock is exceeded. Slabs of the harder lavas drop vertically, then slide away as the clayey wet mass of underlying tuffs flows away from the slope. A lobe of slide debris forms, driven by water pressures within the slide debris and slide plane, and the weight of successive slices of lava. It is most probable that this was not a single cataclysmic event, but rather a gradual movement over time, probably imperceptible to anyone who may have been an observer over the last 10,000 years. The debris lobe "flows" down slope, perhaps in several stages or episodes. A mixture of the overlying lavas and underlying tuffs forms the debris, exposing the chunks of petrified wood and other fossils to our delighted gaze, and forming the undulating landscape beneath the trees that we noticed during our hike in. It is visible to the knowledgeable eye over a fairly large area of many hectares.



The key to the cross section of the McGlashan Slide displayed above and so skillfully interpreted by Greg is as follows:

- **A. Plateau surface:** This consists of glacial tills covering bedrock.
- **B. Head Scarp Zone:** A series of parallel ridges and gashes in arc shape form in the crest area, the largest of which was commented on in Part One of this article.
- **C. Rubble Apron:** A fan or cone of debris has accumulated below the head scarp.
- **D. Slide Debris:** Hummocky mixture of slide debris, and where we find the petrified logs exposed as the lava layers are broken up.
- **E. Swampy Areas:** Ground water seeps emerge from the debris zone as the water is under pressure from the plateau above, and from the accumulations within the cracks in the Head Scarp Zone.
- **F. Lava Flows:** This series of lava beds were laid down when the volcanoes were active.
- **G. Tuffs and Ash:** Extensive deposits of ash accumulate down slope and downwind from volcanic vents, and this is the area in which we find our fossilized trees.
- **H. Slide Slices:** Multiple slide "slices" detach themselves from the main mass of rock.
- **I. Slide Plane:** This is the shear surface upon which the slide debris flows.
- **J. Slide Toe:** This is where the slide comes to rest, and where we found the fossilized remains of woody debris, ferns, grasses and reeds.

Greg noted that the McGlashan Slide is typical of ancient Eocene landslides in bedrock in the Kamloops area. Feldspars in the ash or tuff deposits chemically alter or weather to clay minerals. One of these clay mineral families is notorious for having low strength related to a characteristic ability to significantly increase surface area (swell) by absorption of water molecules. These "swelling clays" can increase to up to 7 times their surface area when wetted, and the reaction can be so aggressive that dry, newly exposed clay can literally suck moisture out of the air, turning what appears to be solid rock into a broken clayey rubble in just a few

weeks or months. It is the water pressures exerted on and the low rock strengths associated with these clayey ashes or tuffs that has resulted in the massive landslide which exposed parts of the Petrified Forest to the light of our present era.

This may be the first time that a comprehensive description of the McGlashan Slide and the ancient geomorphology of the Petrified Forest has been attempted. However, the fact does remain that we have close to Kamloops a unique geological feature that should continue to be preserved and protected from further encroachment, and warrants further professional observation, particularly from college students and other schools of study.