

Voyage to Mars II

Saturday August 23, 2014

Today I started my exploration of « Mars » under blue skies and T°C of ~30 by mid-afternoon.

What a beautiful day, what great geology, what a great martian analogue ! If things keep up like this, I'll be in heaven !

So, before I tell you what I saw today, I'd better give you some context : why does Moses Lake and its surroundings to a distance of about 100+++ km in all directions resemble the planet Mars ? Well, setting aside the Mariner Valley (on Mars) that is as long as Vancouver to Halifax, 100+++km wide and up to 9 km deep, the martian surface is riddled with long canyons, 100m deep and up to several km wide. It's these that have analogues here in eastern Washington in what is formally known as the « Scablands ». The story of the Scablands starts with an ice dam at the end of the Ice Age, about 15,000 years ago., that retained a mass of water equivalent to the modern Black or Caspian seas. One way or another, the ice dam broke and all that water rushed to the Pacific in about a week (imagine the erosive power) – in part using what we now identify as the Columbia and Snake river channels. But there was too much water and a gigantic flood ensued – with the water surface up to 150m above the eroded surface we see today. I'll explain as we go :

I also have to explain that the Scablands vary between « flat » and gently « undulating ». That's to say that the canyons – and there are many – represent negative relief : in other words, you don't find them by just driving around and rubber-necking. That's why I prepared this visit to « Mars » as I would any field trip. Thanks to two excellent guide books and images found on Google Earth, I put together a binder that will guide me to the best outlooks where I can best appreciate the geological phenomena and their relevance to Mars !

I set off today to the SE of Moses Lake – travelling 400 km ! Wow : what wonderful sights ! I summarise below, and I'll avoid the details – nonetheless :

- Close to Moses Lake I entered the region known as the « Drumheller Channels » : superb !! Canyons everywhere – 10s of m deep – cut into horizontal lavas by the floodwaters – with vertical walls ! The overall impression of the terrain was « lunar » - that's to say martian ! But even here, wherever there's soil on a canyon floor, there's a farmer to plant and grow wheat or corn! But for the rest, it's just stone ! To a geologist's eyes, this is beautiful ... and yes, I took lots of photos !



« Drumheller Channels » from O'Sullivan Dam (Potholes Reservoir) (skh)



Going down Devil's Canyon ! Imagine the water that carved it !! (skh)

- Continuing to the SE I arrived at Devil's Canyon ! : my first real coulée – a dead straight canyon with vertical walls up to 50-100 m high, that descends to the Snake River. The canyon was cut by water that passed over a waterfall that, by erosion, cut its way back up the canyon. The final position of the ancient falls is well preserved and easily visible – and dry ! (and yes, I got good photos). I ran up and down the canyon in the car, it was so striking. There wasn't a single other car on the road, so I could stop wherever I wanted to take excellent photos.
- In several places along the Snake River I could observe – and photograph – undulations in the surface of sediments deposited atop the lavas : undulations at the 10-50m scale that represent giant ripples, similar to the smaller examples we see underfoot on sandy beaches. These enormous undulations are the product of the flow of this enormous masse of water that moulded the surface of the rare sediments that it couldn't sweep away into out-size current forms.



Giant ripples – Snake River (*skh*)

- Then : islands of sediments (loëss) that resisted the erosional force of the floodwaters. There were 4 in the group : their elongate form clearly showed the direction of flow of the floodwaters.



Islands of sediments that resisted the floodwaters (*skh*)



Palouse Falls Coulee – looking downstream (*skh*)

- But the showpiece today was the Palouse Falls State Park, with official look-outs from where one could observe a coulée 100m deep, with vertical walls, that zigged and zagged exploiting pre-existing fractures in the bedrock. The key was the fossil falls 100m high, perfectly preserved – they're not dry today, but the modern falls have nothing to do with the water that cut the canyon.

I can't find the words to do justice to these magnificent features that I saw today. But imagine this : to connect between the different coulées that are found at different altitudes, the surface of the flood waters had to be 150m above the dry falls we now see today cut into the bedrock. That means that the dry falls were entirely underwater when they were formed : if you had been standing nearby, you wouldn't have even detected the presence of the submerged falls !!

All day, I was acutely aware of the link between what I was observing and what is commonly proposed as the fundamental mechanism for the formation of similar canyons on Mars. It was both unreal and exhilarating !

OK – that's enough for tonight. Tomorrow I will set off again in search of further geological observations, but I'll have cultural observations to add too.

Best to you all ...

Simon

PS : my legs are no longer stiff, and – in sandals – my toes are much calmer too !!

Monday, August 25, 2014

Yesterday, I was more tired than I realised : I crashed on the bed atop the covers before I had even written my daily log !! Hence, today was shorter so I could rest and catch-up. I had a great day nonetheless : I scoped out Grand Coulee – 80 km long. It's N-S oriented so you have to suss out the evolution of the shadows throughout the day if you're to plan for well lit photos in the days to come. Grand Coulee is incredible, but more on that tomorrow.

Yesterday – Sunday 24th – I went back SE of Moses Lake for another 400km day. I saw more extraordinary things. Without getting too deep into detail :



Grand Coulee – looking South (*skh*)



Wallula gap – looking downstream (*skh*)



Juniper Dunes –«Barchan style» (*skh*)

- I went to see the Wallula Gap on the Columbia River between Pasco and Walla Walla (you'd think I was in Australia !). Here, well before the Ice Age, the lavas were folded by tectonic forces, thereby creating the Horse Heaven Hills (!!). As these rose, the Columbia River, as it was then, progressively cut its bed across the growing hill crest. The erosive power of the floodwaters 15,000 years ago overdeepened the old river bed to carve a deep and impressive canyon right across the hills, with vertical walls 100+++ metres high in the bedrock, but it wasn't wide enough for all the floodwaters to pass. So a very short-lived lake, 400m deep, formed upstream, and within a week it too had emptied through Wallula Gap on its way to the Pacific Ocean. It's still truly impressive to see today !!
- Mars is covered with sand dunes. So are the Scablands – but not to the same extent ! I found a great look-out where I could see a large area of « Barchan » style dunes (their map form is like a lunar crescent or bull's horns) that allow determination of the wind direction that formed them after the floodwaters had receded.
- But what fascinated me was the dry Staircase Rapids : a vaste slope leading from a flat plain to the North to the bottom of one of the larger coulees to the South. In going up and down the slope – by car, it's big !- I could clearly see

three long benches of lava, parallel to the topographic contours, that had resisted the erosive force of the floodwaters and that represented rapids or cascades. The floodwaters on the plain were already extremely deep, but as they flowed down the slope they were 100m deep and running at 115 kph !! As in other examples I have described, these cascades would have been underwater and invisible at the surface. Astounding !



Resistant lava – upper bench of the Staircase Rapids (*skh*)

OK, enough geology for today. I promised some cultural observations.

The Scablands really are impoverished. Despite the vast farms and fields of wheat to the horizon – on the sediments – and the cattle every where, especially on the lava flows – as soon as you enter into a village (they call them cities – but Moses Lake, which is the biggest by far is only 21,000 souls), all you see is run-down : people live in appallingly squalid shacks and mobile homes surrounded by the carcasses of rusty trucks. Half of all businesses – mostly motels and food joints – have closed. Everything is in a state of disrepair – it's sad to have to say it, but you really get the sense of a society on its way downhill.

Around Moses Lake the agriculture is more diversified, with corn that is watered 24/24 (it really is the desert here – despite the ubiquitous wheat : the sign at the entrance to ML reads « Moses Lake ... Desert Oasis »), plus potatoes (McCains has a

processing plant for fries [?] in a nearby village). All the green fields are circular as a function of the irrigation system : giant articulated arms on wheels that turn about an axis : whence ML Oasis. In each village there are processing plants for agricultural products, such as animal feed from corn judging by the odor. Further south – e.g. Walla Walla – you come to a land of apple orchards and vineyards. The vines are very well kept, and much leafier than in France. I've been trying the local wines : most of the whites are very good, the reds less so – they tend to be « overdone ». One I tried a glass of was distinctly « smokey », not what I'm looking for in wine !! But I'm having a lot of fun with the whites (mostly Chardonnay and Pinot Gris) –high alcohol content (~14%) which makes for body. I tried a Viognier, but I wouldn't have known if I hadn't read the label. But they're not cheap : between US\$15-25 a bottle. They also grow something low and green – likely an oil seed of some sort – but the fields are patterned with isolated corn stalks : « weeds » that no-one can be bothered to remove. It looks most peculiar ! And who do you think does all the agricultural work ? No prizes for guessing mexicans : there are field-side signs in Spanish (only) advertising that they're looking for workers

Coming back to the « desert », yesterday I saw a dust storm on the margins of a thunderstorm. With the « Big Sky » perspective of the Scablands (you can see everywhere) the thunderstorm resembles a big jelly fish (think Portuguese Man O'War) with its flat body (cloud) and hanging tentacles (rain). On its margins, where there's wind, but no rain, there's so much dust raised that it's like driving through fog. Even without a thunderstorm, there are frequent dust devils in ploughed fields, and the best way to locate a farmer and his tractor or combined harvester is to look for the pillars of dust in the distance.

This weekend I figured it better to avoid any tourist spots, but I couldn't resist going to Palouse Falls (see August 23rd). There was only one parking spot left when I arrived mid-afternoon, but what struck me was that the families who had come to spend the day – picnic, swim in the lake etc – were Mexican. There were some « white » american couples, but they were in the minority. The other thing that struck me was the total absence of Chinese and Japanese tourists ! They stay in the B.C. mountain country ...

It's interesting to look at the different things that preoccupy different groups of people. According to road signs, Washingtonians worry about contamination by weeds and other maladies by water craft of all kinds. Everywhere there are obligatory road-side inspection stations for all road-transported boats, of any size. Another observation : truck weigh stations are all open here, while in Canada they all seem to be closed. Imagine my surprise the first time I bought gas in Washington : you use your credit card at the pump – nothing unusual in that. But the machine wanted my postal code !! – and in 5 digits (in Canada it's 6). So I went to the reception : a guy covered in tatoos with a feather in his bowler hat suggested that I leave him my credit card while I filled up ! Since I wasn't yet running on fumes, I decided to move on. But it's like that all over ! If you want to pay cash, you pay first. So at Moses Lake I found a Texaco where they understand the difference between

postal codes – and that I didn't look like a thief – and let me fill up first and pay later with my credit card !

There's something similar going on at the trendy bistro in Moses Lake. It's a nice place, very relaxed, offering various pastas, fusion salads (interesting) american style, a huge variety of hamburgers – and some very good local wines (including from Moses Lake) by the glass or retail bottles. There are street-side tables outside, and inside they keep the big main doors open for ventilation. But you order and pay at the cash before sitting at table where you will be served. Are they worried about runners ? Yes, but the gas station guy said it was mostly stolen credit cards – of which there are many – and the postal code is an extra level of security : you don't know it – the card don't work ! Lucky for me I have grey hair, a clean car and an honest face !!!

I found NPR (National Public Radio) in the car. NPR could teach the CBC a thing or two about radio journalism : interesting, international and intellectual. Well done those folks ...

Well my friends, tomorrow I will attempt a short hike up Steamboat Rock in northern Grand Coulee – but early in the morning cos by mid-afternoon it'll be 33°C in the shade ! But I'm gonna wear shoes : it's a good maintained path and I don't trust my boots !!

Best to you all ...

Simon

Tuesday, August 26, 2014

OK ... given the temperature, and the fact that it will drop to the mid-twenties this weekend and the following week, I decided to put off any serious hiking for now and to stick to trips in a well climatized car ! Wise decision if you ask me ! I did do a short hike – about an hour – in the early afternoon, but it wasn't the best of ideas ! Despite the heat (33°C and blue skies) I saw some literally extraordinary sights though :

- Yesterday I told you I'd gone the length of Grand Coulee. Well, today I did the same thing along Moses Coulee. These are the two largest canyons cut into the bedrock (more or less horizontal lava flows, canyons with vertical walls up to 100m+++, tens of km long [80 km for Grand Coulee]). These are the two most impressive coulees in the region. Oriented NNE-SSW, they are both divided into northern (upper) and southern (lower) parts by multiple, giant, vertical, dry cataracts (e.g. Dry Falls : think Niagara in a smaller dry version)

at the same level (not in descending series), separated in each case by a massive « blade » of rock : everything here is 50-100m++ high in any event. The cataracts in both coulees are simply astounding ! In both cases one can observe them from on high – hence in 3D perspective : amazing !!! 500-1000m wide according to location, the canyons were filled to overflowing by the floodwaters, which means that – as in other examples described above – the cataracts would have been submerged under 100m+++ of water at their lips. The scene would have been stupefying, had we been there to see it !



« Dry Falls » - Dry cataract in Grand Coulee looking upstream (*skh*)

- Downstream of Grand Coulee is the Ephrata Plain, flat as a pancake but peppered with large boulders of lava, 1m+++ in size. According to those in the know, the water exiting Grand Coulee was under such pressure that it shot these pieces of lava, ripped up from the coulee, south like shot from a shotgun !! There's one rock that's the size of a small house : well named « Monster Rock » in local parlance.
- Moses Coulee emptied directly into the Columbia River, which is now confined within an enormous gorge, as always cut into the horizontal lava flows. The entry of Moses Coulee into the Columbia gorge is pretty simple. But just to the South is Potholes Coulee : a pair of giant dry cataracts , yet again separated by a rocky « blade », that represent falls feeding water

coming from Grand Coulee, across the Ephrata Plain, to abruptly drop via the cataracts into the Columbia gorge. In brief, all of these floodwaters were interconnected : coulees that emptied onto plains, that in turn emptied into the Columbia River via other coulées and/or cataracts that dropped directly into the Columbia gorge itself – thence on to the Pacific. You can read about it in a guide book, and that's fascinating, but to be here and follow the « ancient waters » on their path to the ocean, that's really something else !



Moses Coulee looking downstream (*skh*)

- It really seems as though everything is bigger out West ! Today I saw a sand bank in the Columbia River gorge, deposited by some of the last glacial floodwaters, the largest in the region and the largest I have ever seen ! In addition, I observed it from a high point right above the river, so in 3D perspective and in brilliant sunshine !! The surface of the sandbank – actually sand + 1.5m boulders - is covered with « mega-ripples » of the kind I have already described, formed by floodwaters up to 200m+++ deep ! These floods were truly a total disaster !!



« Monster Rock » on Ephrata Fan downstream from Moses Coulee (*skh*)



Ephrata Fan covered in boulders (*skh*)



Potholes Coulee – looking downstream to Columbia River (*skh*)



« Mega-Ripples » on Crescent Bar in the Columbia River (*skh*)

OK ... to see all this was another 400 km trip : oof !! – that's enough for today.

Best to you all ...

Simon (« Mars »)

Wednesday August 27, 2014

For those who like to know these things (e.g. me !!), today was a mineral blue sky, not a single cloud, and 35°C.

Things yesterday were grandiose. Today I opted to seek more modest coulees, more or less tributary to Grand Coulee. More or less ? : you'll see what I mean below. These less imposing coulees are nonetheless as interesting as their larger cousins, as instructive as regards their mechanisms of formation, and just as martian !



Différence in level: Columbia (left), Gd Coulee (right) (*skh*)



Deep Lake Coulee, tributary to Grand Coulee (*skh*)

- As it happens, the floodwaters that carved Grand Coulee came from the bed of the Columbia River immediately to the North. But ... the bed of the Columbia River is way lower than the lip at the top of the Grand Coulee. Given that the waters that carved Grand Coulee were already 100++++ metres deeper than the cataracts located in the mid-section of Grand Coulee, you now have to add another hundred or so metres of water depth in the Columbia gorge for the water to pour into what was to become Grand Coulee. As Napoleon's Maréchal MacMahon said upon reaching the Mediterranean : « que d'eau, que d'eau » !! But to be there, directly confronted with this topography that the floodwaters had to pass over, was nothing short of extraordinary !!
- But, as I said, I focused today on more modest coulees. I already told you how Grand Coulee is divided into two parts (north and south) by a pair of Niagara-style cataracts. Well, it turns out that the floodwaters coming down from the North couldn't all fit. So there were « leaks », and water escaped to one side of the main cataracts and carved a set of secondary coulees. All in all I visited a half dozen of these today. Where ? South of Coulee City, if you can find that in your Atlas !! These smaller coulees are marvelous. In many cases, their floors are intensively cultivated thanks to groundwater irrigation : and

the green oil producing plant ? – alfalfa ! But if you ignore the agriculture, it's really martian !



Hudson Coulee, accessory to Grand Coulee (*skh*)

In almost all of the coulees there are farms that grow wheat, corn, alfalfa and apples. Whence comes the water in this rock desert ? I already mentioned underground aquifers, apparently inexhaustible, but they also use small coulees to guide irrigation canals. The supreme irony is that this was the hypothesis of astronomers at the dawn of the 20th Century : irrigation canals on Mars. Well, there might be coulees, but no irrigation canals up there !

OK, no point in going into unnecessary details : I think you get the gist of what I saw and appreciated today. But during the course of the day, I had a philosophical question : if you don't have a geologist's appreciation for the finer points of these vast cliffs of dark and austere lava that box you in on all sides, it must be tough to live with long-term !!

Best to you all ...

Simon (« Mars »)

Thursday August 28, 2014

Is it the landscape or what ? : americans are so direct ! The road signs don't mince words : « Click it or Ticket » for seat belts, or « Litter and it will hurt you ».

From what I can make out, Moses Lake is surrounded by erosional coulees, except to the East where sediments dominate. Regionally, there are three kinds of sediments : sands and loëss deposited on – and therefore younger than – the lava flows, and bouldery sand linked to the slowing of the glacial floodwaters. Loëss ? : that's a kind of dust, powdered rock crushed by the action of the ice sheet. Winds blowing from glacial deserts carry this stuff wherever, in this case to the Scablands of Washington : and it's 100s of metres thick ! It turns out that loëss is very fertile, which is what enables intense modern agriculture here : on the « sediments ».

- So, I headed well east of Moses Lake today in search of two things : islands of loëss that had resisted the erosive power of the late glacial floodwaters – and the prettiest coulee in all the Scablands ! The islands of sediments are very important in the potential parallels we can draw with the planet Mars. On the red planet, there's a vast canyon network that on Earth would extend from Vancouver to Halifax. At its eastern end it opens onto what may have been the floor of an ocean that covered the northern part of the planet. There are good indications that giant floodwaters ripped up much of the sediment on the floor of the canyons – leaving only hydrodynamically-formed remnants whose shape indicates the flow direction of the water. Well, there are identical islands of sediment here on « Mars » - and I have seen and photographed them today ! To a geologist's eye, this is magnificent !! They are everywhere : but enough of this. However, I must tell you that there's a spot – 10x30 km – that formed an « island » that got submerged from time to time such that the top got moulded into bumps by the floodwaters : I spent two hours driving around in this stuff ! It's on these bumps that you find the most fertile soil for wheat, so if the tractor can get up the slope, they plough, sow and harvest ! It's a weird terrain : the furrows follow the contours !! Kind of asian !
- On its east side, this large, ancient « submerged island » of loëss is bounded by a coulee of modest width and depth – with vertical walls nonetheless – and a floor greener than I have seen anywhere else in the Scablands. It's truly pretty !!

I've had requests for pictures of the coulees : now ! OK – I'll get on it - tomorrow, but I can only post 6 at a time ... running out of room on my web site. I'll change them every 48 hours. For those who want, I'm putting together an illustrated compilation of these travel logs that I could send once I'm back in Ottawa. But you'll have to explicitly ask for it : I don't want to SPAM anymore than I'm already doing !



Island of loëss that résisted : water flowed left to right (*skh*)



Cultivation of the top of the big “submerged island” (*skh*)



Prettiest of coulees : « Hole-in-the-Ground » (*skh*)

Today I got lost in Sprague : a village with a single main street and maybe 1500 souls. Lost ? : but how ? I'll get to that. Sprague contains the socio-economic history of the Scablands. Allow me to explain :

I found several books of photos and commentary pertaining to the region around Moses Lake and just south of Grand Coulee – photos representing the first half of the 20th Century. These impoverished villages were once thriving and well to do. Hotels and restaurants of a certain standing, filled to over-flowing with eager tourists. Soap Lake, just south of Grand Coulee was a high spot for taking the waters : alkaline waters – for your health and what ailed you. Getting back to Sprague : along main street there are still « grand » buildings, two stories, forming street corners. These were grand offices, hotels and important shops - it must've resembled a scene out of a western movie. : but now it's all in ruins, mostly closed. You can imagine the hustle and bustle 75-100 years ago. But today, there's not a cat in the street – and not a road sign to indicate how to get to the Freeway that's 500m from there : that's how I got « lost » in Sprague.

How did things end up this way ? I don't know – but I have to ask myself if the RV boom hasn't taken a lot away from the more classical hotel/restaurant market.

According to my books, it was like this everywhere : the excitement of opening this part of the country, particularly to agriculture – a movement that's out of gas wherever I look. Apparently, Moses Lake (Neppel til 1938) bloomed on account of military bases and the fact that Boeing tested its aircraft here (now Grant County International Airport !!).

In contrast to the Prairies where primary woodland was taken out to make way for the white man and his fields, the photos in my books would suggest that the natural flora here was essentially sage brush. The trees we see today are imports (eucalyptus etc) to embellish the widely dispersed farm houses scattered about.

Final observation for this evening : my books tell me – little – about the First Nations who lived here free til the late 19th Century : the Sinkiuses, the Wanapums. Names seemingly unknown today ... of which there's little trace in my road travels across this austere country. Michèle would've had a few things to say about that ...

Best to you all

Simon (« Mars »)

Saturday August 30th, 2014

Today was one of those days you don't forget : and for the best of reasons !! I already knew that there was a risk of cloud and rain during the afternoon, so I left early in search of a pair of dry cataracts separated by the now infamous rock blade – think Dry Falls, but way up on high. This site is located in the very northern part of Grand Coulee, just east of Steamboat Rock ... but in order to see everything, it was necessary to climb to the top of the cliffs that define Grand Coulee itself !

Thinking fauna for a moment, things started out well : a coyote crossed the road right in front of me (me at 100 kph, him sauntering ... !). I had already seen corpses on the local highways, but this was the first live one I'd seen. Once atop the cliffs, I came across 6 deer only several tens of meters from me, caught between their own surprise at finding me there, and their curiosity : what exactly was this Canadian beast that just burst upon the scene ? I saw this group several times, assuming it was the same group of course. When they run, they bound like Springboks : it's funny to watch ! But at the end of the day, on the way back to Moses Lake, they were a menace. Twice in the space of 3 km they were on the road right in front of me !!!! OK, no problem this time around : brake hard and all is well – but within a few metres : I slowed down !!



2 cataracts, breached left, intact right, rocky blade between the 2 (*skh*)

I won't go into detail (tho I could !!), but from up high Grand Coulee is simply magnificent. I found myself looking straight across at the top level of Steamboat Rock ... but the cataracts I had come to see were extraordinary !! Initially, I was a bit confused. : I could only see one, although I could clearly identify the rock blade that separated it from its twin next door : but the twin was less than evident ! Then it clicked : once upon a time there was indeed a second cataract adjacent to the first, but it had been breached – eroded, removed such that you could now see beyond it and to the horizon behind ! This should give you an idea of the erosive force of these floodwaters : create a cataract in bedrock, then remove the whole shebang – including everything upstream – and all in a few days ... as well as the surgical precision of the floodwaters : all of the above, yet perfectly preserving the twin cataract next door at only several 100s metres distance. To think that I could see all this under sunny skies with just a touch of a veil of cloud !!

After that, the weather went downhill : I went on to investigate other sites. They were geologically very interesting for me, but maybe not for you. So I'll stop right there.

Before climbing to the top of the cliffs, I met a guy, my age, who was going climbing. High school teacher, he had been climbing in the area for 30 years and had written books on the subject. But he was fascinated to discover, thru our discussion, that the

kind of geology I had come to observe existed in his backyard. At least he knew of the coulees and something about how they had formed. But, you know, whenever I tell folks what I'm doing in central Washington, in the bistro, at the motel, at the gas station, they tell me : « Yeah, I've heard tell of such and such a place (coulee, cataract etc etc), I've lived here for 20 years and I've never been there ». Maybe it's like that everywhere : it's the tourist that discovers what the locals ignore ! What do you think, those of you who have traveled far and wide ?

OK – that's it for tonight. The weather's gonna be a mix of sun and cloud for the final few days of my exploration of « Mars ». But hey, I ain't complaining « : I've had it pretty good up til now.

Best to you all ...

Simon (still on « Mars »).

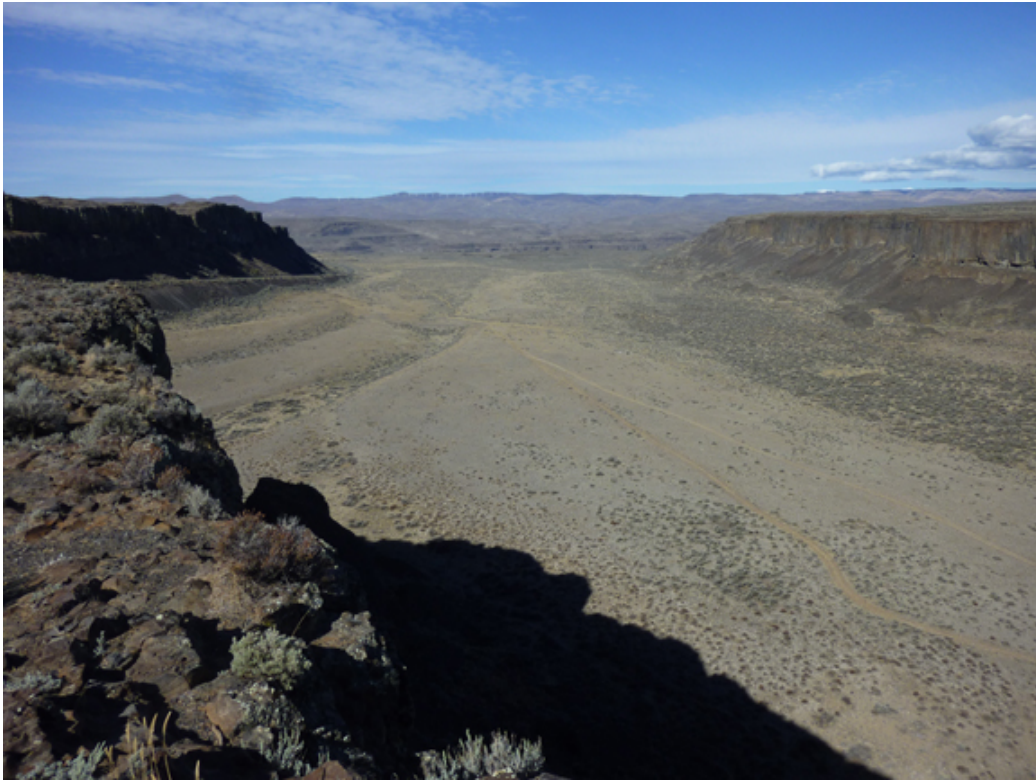
Sunday August 31st, 2014

OK – I knew that the US was the « the land of the free ! » , but there are those that take the interpretation of the phrase to the extreme ! In normal parlance, NO CAMPING and NO HUNTING are pretty much unequivocal – especially in a state park - but apparently not here ! My intent today was to investigate two pairs of pretty big cataracts, separated from each other by a spectacular rock blade, that would've emptied directly into the Columbia Gorge immediately downstream. I got lucky this morning : the light was great and perfectly oriented wth respect to my targets. The first site – Frenchman Coulee, those French again ! – I traversed up and down by car, but at the second site – Potholes Coulee – I was able to profit from a really pleasant, short hike to the foot of the cataract. In each case the geology was amazing. In short, I had a great day !!

Between the two sites – and remember we're talking areas that give directly onto the Coulmbia Gorge, pretty much lost in a vast, empty agricultural landscape – I suddenly come across a huge « field » filled with 500-1000 camping cars and caravans. Duh ???!! It wasn't til I got back to the motel and looked it up on Google Earth that I twigged :

<https://maps.google.com/maps?f=q&hl=en&q=754+Silica+Road+Nw,+Quincy,+WA+98848&sll=37.0625,-95.677068&sspn=35.821085,81.738281&layer=&ie=UTF8&z=15&ll=47.101944,-119.985895&spn=0.015044,0.039911&t=h&om=1&iwloc=addr>

Use the zoom to get the context ...



Frenchman Coulee – Columbia Gorge directly downstream (*skh*)



Potholes Coulee : the cataract seen from above – Columbia Gorge below (*skh*)

These vehicles were gathered in the large circular field with concentric alleys. Next door, on the upper shoulder of the Columbia Gorge is a « natural » amphitheater with 20,000 places. I suppose there was a major event planned for the holiday weekend. But when I saw this in the distance, I was sure it was a town that wasn't marked on the map !!

Two more days to complete my exploration of « Mars ». I must say, I seem to have calculated well – it really did take two weeks for me to get to do everything on my programme.

Best to you all ...

Simon (still on « Mars »)

Monday September 1st (Labour Day), 2014

Voilà – the exploration of « Mars » approaches an end. Tomorrow, my final task is to climb up Steamboat Rock and get a peek at the other (hidden) side of Grand Coulee at its latitude. But let's speak of today : what a magnificent day !! Blue sky and sunshine all day. I did a couple of hikes: both on high and down low with respect to the huge cataracts hiding on the « other » side of the rocky blade at Dry Falls. There's only hiking access, which suits me fine, From down below, I saw the majesty of Monument Falls, a giant cataract – twin and neighbour of Dry Falls itself. From up on high, I saw magnificent potholes dug in benches of lava by vortices at the bottom of the floodwaters. Very possibly this does nothing for you, but for the geologist in me this was heaven !! And I can prove it : I have excellent photos !!

Tomorrow, a final hike - for me : up to the top of Steamboat Rock. I doubt it will interest many of you. The next day I head for the dinosaur museum in Drumheller, AB. I'm counting on two days there – so no bulletin from me between now and Sept 5th. After that, I head for Ottawa – after a stop back in Calgary to see my friend Martin. Then – Ottawa by the same route I came. They say that a road travelled in both directions is two different roads. Maybe so : but is a road travelled on the return worth a fullcourt report ? I doubt it. So, after Drumheller, I don't foresee any further reports til I get home to Ottawa - around the 10th of September.

I have to say that this adventure – planned since last year – has been a personal thrill. The intersection of geology and astronomy – especially planetary – has been one of my passions for 20 years. To be able to render tangible that which I had hitherto only read – this is an integral part of what makes my world turn !! It's fulfilling !



Monument Cataract looking upstream – rocky blade to left (*skh*)



Deep Lake Coulee – the bench of potholes (*skh*)



Potholes in Deep Lake Coulee (*skh*)

Best to you all ...

Simon (getting ready to leave « Mars »)

Sunday Sept 7th, 2014

Well ... here I am, on the road home.

I left « Mars » (Moses Lake) last Wednesday, headed for Drumheller, AB, and its dinosaurs. The climate gods must like me and my planetary adventure. I drove ML-Drumheller under poring rain and very low cloud ... but this was the only weather day I've had since leaving Ottawa. In addition, the rain cleaned up the car so I almost

looked respectable when crossing the international frontier. So much so that the customs officer called me « sir » and said « Welcome home » !

From the frontier I crossed the mountains via Crowsnest Pass where snow had fallen the night before – down to road level !! At the hotel that night I checked the internet : apparently this kind of thing is normal for the passes : Phew ! I began to wonder if the next glaciation was coming !



Badlands

At Drumheller, I had come essentially for the Tyrrell Museum, world leader in dinosaur exhibits. I have to say that this museum is simply magnificent – perfectly laid out, perfectly lit !! You can gauge my reaction when I tell you that, after drastic pruning, I kept 196 photos of the exhibits – and that I went to the museum twice ! But it's just as well that I took lots of photos cos – believe it or not – there is no coffee table format book with photos of the museum's contents. This has to be the only world class museum not to have produced such a publication ! Pity ...

Drumheller is located in the Red Deer river valley and is part of what is referred to as the « Badlands ». In my ignorance, I had assumed that « Bad » referred to agricultural conditions : i.e. the delicate balance between intensive wheat cultivation and dry conditions (viz : the dustbowl of the 30's). But no : apparently it comes from the french voyageurs who referred to « *bad lands for crossing* » in reference to its



Dinosaur 1



Dinosaur 2



Tyrannosaurus Rex

difficult terrain – and slippery mud in times of rain. Hah ... travel forms the mind – even when you're no longer that young !

After 2 days at Drumheller, I retraced my steps back to Calgary for a great visit with Martin (Fowler) : we spent Saturday afternoon and evening chatting til late in the evening.

Then I hit the road this morning, a beautiful warm day (A/C in the car) under clear blue skies – that continue this eveing. According to Martin, Calgary will get snow Monday and morning temperatures of ZERO. Ontario, here I come ...

OK : this is my last bulletin until I land in Ottawa in a few days from now ...

Best to you all ...

Simon (Regina).

Wednesday Sept 7th, 2014

I "touched down" in Ottawa tonight at 9.30 pm - 13.5hrs non-stop (except for re-fueling) "flight" from Marathon, Ont. !

I'm tired ... but very happy !

A reminder : let me know if you want me to send you an illustrated compilation of my travel log.

Best to you all ...

Simon