Chapter 14

Quartzite Rocks Transported up to 800 Miles East

The Rocky Mountains west of the continental divide are the source of the quartzite gravels found at numerous locations in the northwest United States and adjacent Canada. This chapter will examine the gravel deposits on the High Plains east of the continental divide.[1] There are no bedded quartzite outcrops in the High Plains sedimentary rocks, composed mostly of sandstones and shales. Based on paleocurrent directions and the nearest sources of the bedded quartzites, we can determine how far the quartzites traveled from their source. From there, we can deduce what is the most probable mechanism of transport.

This chapter will examine the coarse rounded quartzite gravels east of the continental divide on the High Plains.[2]

Location of Quartzite Gravel High Plains East of Rocky Mountains

There are numerous gravel locations east of the Rocky Mountains in Montana, southern Alberta, southern and central Saskatchewan, southwest Manitoba, and western North Dakota. The gravel, predominantly quartzite, is found on every planation surface of the High Plains. The planation surfaces are at generally *four elevations* relative to the distance from the Rocky Mountain front (see Volume II of this book).[3] They have been eroded during each cycle of planing so that the highest planation surfaces are the smallest remnants and generally called high plateaus. It is likely that the entire High Plains area was once carpeted with quartzite gravel at the elevation of the highest planation surface, but further Flood erosion reduced the original planation surface to a few isolated remnants. This activity must have continued three more times, reducing the High Plains down in increments. After Noah's Flood, glaciation continued to erode or modify some of the planation surfaces. In this chapter, I will focus on the well-rounded quartzites found on the top two planation surfaces (Figure 14.1) and briefly summarize the quartzites found at two lower planation surfaces. The top two planation surfaces are the Cypress Hills and Flaxville surfaces.

Cypress Hills Quartzite Gravel

The Cypress Hills of southeast Alberta and southwest Saskatchewan is the top planation surface of the High Plains. It extends approximately 80 miles (130 km) east-west, and is wedge shaped, being 3 miles (5 km) wide at the western end and about 18 miles (30 km) wide at the eastern end (Figure 14.1). The flat surface of the Cypress Hills (Figure 14.2) used to be continuous over this entire area, but was dissected either by very late

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1 Oard, M.J., J. Hergenrather, and P. Klevberg, 2005. Flood transported quartzites—east of the Rocky Mountains. *Journal of Creation* 19(3):76–90.

2 Oard, M.J., J. Hergenrather, and P. Klevberg, 2005. Flood transported quartzites—east of the Rocky Mountains. *Journal of Creation* 19(3):76–90.

3 Alden, W.C. 1932. Physiography and glacial geology of eastern Montana and adjacent areas. *U. S. Geological Survey Professional Paper 174*, Washington, D.C.

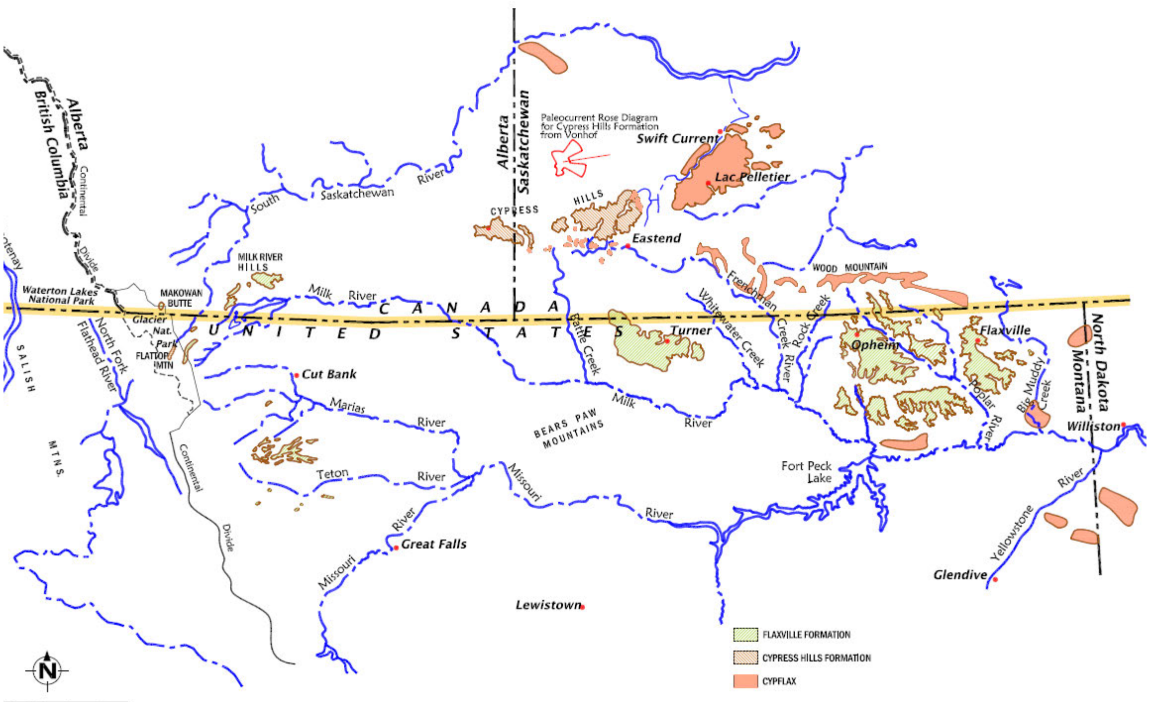

Figure 14.1. Location of rounded quartzite gravel on the top two planation surfaces of northern Montana and adjacent Canada, east of the inferred source area located in the western Rocky Mountains. The brown color represents the gravel on top of the Cypress Hills (the top planation surface), green is the gravel on top of the Flaxville Plateaus (the second from the top planation surface), and the red is miscellaneous quartzite locations that Klevberg and I call Cypflax. Only the western Cypress Hills, the Flaxville plateaus, and the Wood Mountain Plateau of southern Saskatchewan are considered unglaciated. Note the rose diagram at the middle, top of the figure, which shows the gravels from the Cypress Hills came from the west southwest.

Figure 14.2. The Flat surface of the Cypress Hills at Upper Battle Creek. The surface has been partially dissected, likely from glacial meltwater rivers, since large crystalline boulders from the Ice Age were found within the valley.

channelized Flood currents or large glacial rivers that broke across the planation surface and eroded channels. I have found large crystalline erratic boulders in the dissected valleys of the Cypress Hills, so glacial rivers once flowed through these valleys and channels. The total area of the Cypress Hills before dissection was around 1,560 mi^2 (4,000 km^2).[4] The dissection has divided the Cypress Hills into western, central, and eastern blocks of which the first two are part of the Cypress Hills Interprovincial Park.

The western edge of the Cypress Hills is 4,810 feet (1,466 m) msl and rises about 1,000 feet (300 m) above the next planation surface below, called the Flaxville planation surface (Figure 14.1 and see below). It is about 2,500 feet (760 m) above the rivers to the north and south. So, the Cypress Hills represent a high plateau. It is likely that the top of the gravel-capped Cypress Hills planation surface used to extend in all directions for hundreds of miles, and erosion whittled it down to what we see today. The Cypress Hills planation surface slopes gradually downward from 4,810 feet (1,466 m) msl at the western tip toward the east at about 14 feet per mile (2.7m per km)[5] to 3,510 feet (1,070 m) msl at its eastern end near Eastend, Saskatchewan. This slope is not too different from the general eastward slope of the High Plains, which slopes from the eastern edge of the Rocky Mountains east into central Canada.

Figure 14.3. Cemented quartzite gravel (conglomerate) of the Cypress Hills at Conglomerate Cliffs.

Figure 14.4. Close up of conglomerate in Figure 14.3.

The most remarkable fact about the Cypress Hills is that the western and central blocks are capped by an average of about 100 feet (30 m) of well-rounded, cemented quartzite gravel (Figures 14.3 and 14.4). Since the rocks are rounded and cemented, it

[4] Crickmay, C.H., 1965. An interpretation of erosional discrepancy, Cypress Hills. *Alberta Society of Petroleum Geologists 15th Annual Field Conference Guidebook*, part I, pp. 66–73.

[5] Vonhof, J.A., 1965. The Cypress Hills Formation and its reworked deposits in southwestern Saskatchewan. *Alberta Society of Petroleum Geologists 15th Annual Field Conference Guidebook*, part I, pp. 142–161.

would be considered a conglomerate. There is reworked quartzite gravel along the edge of the Cypress Hills mostly to the south called the "redeposited Cypress Hills Formation."[4] Nearly all of the quartzite gravel exhibits a uniform patina or coating of iron oxide and around half contain abundant percussion marks, circular to semicircular cracks about 0.4 to 1.2 inches (1 to 3 cm) across and less than a tenth of an inch (a few mm) deep.[6] One exceptional boulder we found had percussion marks 1.5 inches (4 cm) in radius (Figure 14.5). Percussion marks on hard quartzite cobbles and boulders imply very turbulent flow. Rocks must have been briefly carried in suspension, smashing into one another as they moved with the current.

Figure 14.5. A boulder with large percussion marks 1.6 inches (4 cm) in radius found in the western Cypress Hills, southeast Alberta (head of rock pick is 7 inches (18 cm) long.

The eastern block of the Cypress Hills contains about as much gravel as is found on top of the western and central blocks, but it is dispersed between layers of fine-grained sediments, mostly sand and sandstone, through a depth of about 300 feet (100 m) or more. Many mammal fossils are found within these fine-grained sediments and this is how they date the Cypress Hills gravels. They have assumed the evolution of mammals in the Cenozoic Era (see Appendix 8 for an analysis of these fossil dating methods for the quartzite gravels).

To the east-northeast of the Cypress Hills lies another large, quartzite-capped plateau called the Swift Current Plateau (Figure 14.1), which rises only about 100 feet (30 m) above the surrounding plains. Figures 14.6 shows the gravel capping the plateau, which was once considered independent of the Cypress Hills, based on fossil dating, but a more recent analysis concludes that the Swift Current Plateau is an east-northeast extension of the Cypress Hills. The mammal fossil dating of the Swift Current Plateau is questionable, as shown in Appendix 8. More details on the Cypress Hills, the gravel cap, and its relationship to the Swift Current Plateau are provided in Appendix 6.

Evidence that the Cypress Hills quartzite-capped planation surface extended hundreds of miles in all directions is based on a few other erosional remnants that can be correlated with the Cypress Hills Planation surface. One erosional remnant is the quartzite gravel-capped Sheep Mountains west of Glendive in southeast Montana, about 1,300 feet (400 m) above the Yellowstone River and about 250 miles (400 km) southeast of the

[6] Leckie, D.A. and R.J. Cheel, 1989. The Cypress Hills Formation (upper Eocene to Miocene): a semi-arid braidplain deposit resulting from intrusive uplift. *Canadian Journal of Earth Sciences* 26:1,918–1,931.

Figures 14.6. Quartzite gravel-capped Swift Current Plateau at Lac Pelletier, Saskatchewan, Canada.

Cypress Hills (see Figure 36.7). This gravel, called the Rimroad Gravel by Howard,[7] is also fairly extensive on the hills northwest of the lower Yellowstone River and on a lower bench about 650 feet (200 m) above the river.

Flaxville Quartzite Gravel

The Flaxville quartzite gravel is found on plateaus mostly in north central and northeastern Montana that rise about 300 to 600 feet (110 to 200 m) above the surrounding plains (Figure 14.1).[8] Like the Cypress Hills, the Flaxville planation surface is an erosional remnant left over from the deep erosion of the High Plains. The Flaxville gravel has a more variable depth of 3 to 100 feet (1 to 30 m) than the Cypress Hills gravel. The gravel is indistinguishable from the Cypress Hills gravel in having a common iron patina and percussion marks on the quartzites. We have named all this gravel "Cypflax" for short because gravel on both planation surfaces is actually the *same*. However, the Flaxville gravels are dated significantly younger than the Cypress Hills gravels, based on mammal fossils, found within the gravels and their interbeds, within the evolutionary mammal dting scheme (see Appendix 8).

The Flaxville planation surface was likely continuous for hundreds of miles just like with the Cypress Hills Planation surface. This deduction is based on erosional remnants at other locations on the High Plains—some quite far away. There are some planation surfaces remnants on the top of high hills just east of Glacier Park that are correlated with the Flaxville planation surface, but they do not have high-grade quartzite gravel topping them (see in-depth section at the end of the chapter). Other remnants of the eroded Flaxville Planation surface likely include the Wintering and Hand Hills, about 750 feet (225 m) above the surrounding plain, around Drumheller, Alberta.[9] However, this correlation is partly based on mammal fossils, but their elevations above sea level and their distance

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[7] Howard, A.D., 1960. Cenozoic history of northeastern Montana and northwestern North Dakota with emphasis on the Pleistocene. *U. S. Geological Survey Professional Paper 326*, Washington, D.C.

[8] Oard, M.J. and P. Klevberg, 1998. A diluvial interpretation of the Cypress Hills Formation, Flaxville gravels, and related deposits. In, Walsh, R.E. (editor). *Proceedings of the Fourth International Conference on Creationism*, technical symposium sessions, Creation Science Fellowship, Pittsburgh, PA, pp. 421–436.

[9] Warren, P.S., 1939. The Flaxville plain in Alberta. *Transactions of the Royal Canadian Institute 22* (Part 2):341–349.

Figure 14.7. Gravel cap on top of the Wintering Hills, about 15 miles (25 km) south of Drumheller, Alberta, Canada, approximately 750 feet (225 m) above the surrounding plains.

from the Rocky Mountains is about right for them to be erosional remnants.[10] These hills are capped by quartzite gravel but with only a few cobbles and boulders with percussion marks (Figure 14.7).

The Wood Mountain Plateau Gravel

Low altitude plateaus are found between the Swift Current Plateau and the Flaxville Plateaus north of Opheim and Flaxville (Figure 14.1). The elevation of the Wood Mountain Plateau is intermediate between the Cypress Hills and the Flaxville plateaus, the top two planation surfaces considered. This is why the division of the High Plains planation surfaces into four levels is a simplification. The Wood Mountain Plateau is capped by a thin veneer of Cypflax which is still bedded in a few locations (Figure 14.8). The gravel is as much as 100 feet (30 m) thick.[11]

It is interesting that a portion of the Wood Mountain Plateau and the Flaxville Plateaus around Flaxville were never glaciated. Glaciation occurred after the Genesis Flood and was caused by the Flood.[12] Such a "driftless area," as it is called, well north of the ice sheet boundary, which extended as far south as the Milk River Valley of Montana, is perplexing to uniformitarian scientists. It clearly tells us that the ice sheet over south-central Canada and the adjacent northern United States was quite thin, while it should have been much thicker according to uniformitarian ice sheet models (see Appendix 7).

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[10] Storer, J.E., 1969. An Upper Pliocene neohipparion from the Flaxville Gravels, northern Montana, *Canadian Journal of Earth Sciences* 6:791–794.

[11] Leckie, D.A., 2006. Tertiary fluvial gravels and evolution of the Western Canadian Prairie landscape. *Sedimentary Geology* 190:139–158.

[12] Oard, M.J., 2004. *Frozen In Time: The Woolly Mammoth, the Ice Age, and the Bible*, Master Books, Green Forest, AR.

Figures 14.8. In situ quartzite gravel at the top of the Wood Mountain Plateau, south central Saskatchewan.

Another interesting conundrum in this area is that the Wood Mountain gravel is identical to the gravel of the Cypress Hills and Flaxville Plateaus, but the gravels on each of these plateaus is given different ages within the middle and late Cenozoic of the uniformitarian time scale. The ages are based on the fossils found in the gravel and within interbeds between the gravel. If there were millions of years difference between the gravels, the oldest should be much more weathered. This suggests that the millions of years claimed by the Cenozoic mammal dating scheme for Cypflax from different locations is false (see Appendix 8).

Quartzites Common at Lower Elevations

Well-rounded quartzite rocks are also found extensively on the plains between and around the plateaus already discussed. The coarse gravels are given different names, such as the "Saskatchewan Gravel" or the "Empress Gravel."[13,14,15] Figure 14.1 shows many of these gravel deposits, but not all. The Crane Creek and Cartwright Gravels near the Montana/North Dakota border are included on the map as Cypflax.

The Saskatchewan Gravel occurs undisturbed below the glacial debris in places.[12] It is also exposed under the glacial debris in preglacial river valleys of southern and central Alberta and southern Saskatchewan.[16,17] Some of the Saskatchewan gravel was reworked and re-deposited in the pre-glacial river valleys.[18] Since the ice sheet that occupied southern Alberta and Saskatchewan during the Ice Age only partially eroded the Saskatchewan gravel, the ice sheet must have been thin and not particularly erosive. This observation

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[13] Stalker, A. MacS., 1968, Identification of Saskatchewan gravels and sands, *Canadian Journal of Earth Sciences* 5:155–163.

[14] Whitaker, S.H. and E.A. Christiansen, 1972. The Empress Group in southern Saskatchewan, *Canadian Journal of Earth Sciences* 9:353–360.

[15] Evans, D.J.A. and I.A. Campbell, 1995. Quaternary stratigraphy of the buried valleys of the lower Red Deer River, Alberta, *Journal of Quaternary Science* 10(2):123–148.

[16] Williams, M.Y. and W.S. Dyer, 1930. Geology of southern Alberta and southwestern Saskatchewan. *Geological Survey of Canada Memoir 163*, Canada Department of Mines, Ottawa.

[17] Westgate, J.A. and L.A. Bayrock, 1964. Periglacial structures in the Saskatchewan gravels and sands of central Alberta, Canada. *The Journal of Geology* 72:641–648.

[18] Westgate, J.A., 1968. Surficial geology of the Foremost—Cypress Hills area, Alberta. *Research Council of Alberta Bulletin 22*, Edmonton, Alberta.

also supports the idea that there was only one ice age in southern and central Alberta[19] and the Ice Age was short.[11]

The lower elevation quartzite gravels in Alberta and Saskatchewan have commonly been mixed with glacier debris. We have checked much of this glacial debris along the main roads in the south, and usually a large percentage of the stones are quartzites eroded from pre-glacial quartzite deposits. The quartzite cobbles and boulders in the glacial debris are only slightly weathered, indicating little glacial modification.

However, some pre-glacial gravels capping bedrock and underneath the ice sheet were *not* eroded, including the gravel on top of the Swift Current Plateau, south of the city of Swift Current. The Cartwright gravel, exposed around Williston, North Dakota, and the Crane Creek gravel, found at lower elevations of northeast Montana also were not eroded.[6] Cypflax rocks can also be found capping mesas along the edge of the Missouri Coteau in northwest North Dakota.[20] Cypflax-like gravels have been reported by Alden 145 miles (230 km) east of the northeast corner of Montana along the 49th parallel.[21] Quartzite gravel also occurs in southwest Manitoba.[17] Such uneroded Cypflax indicates glaciation was weak in this area and that there was most likely only one thin ice sheet and little time since the Ice Age (see Appendix 7).

There is also a formation underneath the ice sheet debris that is only partially eroded. It is the Empress Formation that contains a fair amount of quartzite gravel. The Empress Formation is located in southern and central Saskatchewan and southwest Manitoba. I have found typical Cypflax cobbles in the glacial debris north of Saskatoon, Saskatchewan, which was eroded from the Empress Formation by the ice.

Quartzite cobbles and boulders are also found at many locations of Alberta north of the Cypress Hills into northern Alberta.[22] These quartzite rocks have been transported up to 250 miles (400 km) from their nearest sources to the southwest, the mountains of western Alberta and British Columbia. The largest quartzites are found on the highest terrain and decrease in size at lower elevations. It is interesting that the currents that swept these quartzites far out onto the plains also transported gold, platinum, and diamonds! In fact a by-product of Alberta gravel production is the mining of placer gold in the quartzite gravels, valued at almost $1 million a year at 1994 gold prices! This shows that the transporting water currents were moving at a high velocity.

The Quartzites Transport from the Southwest

How far were the quartzite gravels transported? In the top, middle portion of Figure 14.1 there is what is called a rose diagram, which shows the directions from which the gravel was transported. In this case all the measured directions averaged from the west-southwest. A later analysis came up with an average current direction more from the

[19] Young, R.R., J.A. Burns, D.G. Smith, L.D. Arnold, and R.B. Rains, 1994. A single, late Wisconsin, Laurentide glaciation, Edmonton area and southwestern Alberta. *Geology* 22:683–686.

[20] Howard, A.D., G.B. Gott, and R.M. Lindvall, 1946. Late Wisconsin terminal moraine in northwestern North Dakota. *GSA Bulletin* 57:1,204–1,205.

[21] Alden, W.C. 1932. Physiography and glacial geology of eastern Montana and adjacent areas. *U. S. Geological Survey Professional Paper 174*, Washington, D.C., p. 8.

[22] Dixon Edwards, W.A. and D. Scafe, 1994. Mapping and resource evaluation of the Tertiary and preglacial sand and gravel formations of Alberta. *Alberta Geological Survey Open File Report 1994-06*, Edmonton, Alberta.

south-southwest or southwest.[10] Combining these transport direction estimates, the average would be from the southwest.

These ancient current directions are based on the way oblong cobbles and boulders lie upon one another in the gravel and on certain structures within interbedded sandstone, such as the dip of sandstone cross-beds. If the dipping gravel lay like shingles on a roof (Figure 14.9), the current was flowing in the direction going up the dip (to the right). This is because when these cobbles and boulders were deposited, the drag caused by the rock scraping against the bottom caused the higher end of the rock to lean over in the direction of the current.

Figure 14.9. Imbricated oblong rocks from the Thorp Gravel, west of Ellensburg, Washington. Current direction is from left to right.

Therefore the quartzites on the Cypress Hills and by inference all the quartzites discussed in this chapter, since they are mostly south and east of the Cypress Hills, came generally from the southwest.

Transport up to 800 Miles from West of the Continental Divide

Considering there are many billions, if not trillions, of rounded rocks on the High Plains, the layers of bedded quartzites must have been huge. The nearest outcrop of thick-bedded quartzites lies in the western Rocky Mountains, west of the continental divide (see Chapter 13). This deduction is reinforced by Leckie and Cheel, who believe that the quartzites on top of the Cypress Hills originated from central Idaho.[5] I would say that these uniformitarian geologists are correct on this point.

Therefore, the quartzites were transported hundreds of miles by water from west of the continental divide to the High Plains (see scale on Figure 14.1). More specifically, if the quartzites on the Cypress Hills originated from central Idaho, the transport distance is about 400 miles (640 km), but if the source was more in northwest Montana it would still be about 300 miles (480 km). The well-rounded quartzite rocks northeast of Saskatoon, were transported about 650 miles (1,040 km). And finally the quartzites reported along the 49th parallel along the North Dakota/Manitoba border, which probably connects with the reported quartzite in southwest Manitoba, were transported about 800 miles (1,280 km)!

These distances are very much greater than any river can move the rocks, especially since the eastward slope of the High Plains has an average slope that is very low. Consider also, the quartzites came from west of the continental divide and carpeted nearly all of the High Plains like a sheet apparently all at the same time.

These observations imply a watery catastrophe with a current that was at least hundreds of miles wide and moving at high speeds eastward over the current continental divide (which likely was not a divide at the time, see Chapter 23). Peter Klevberg estimated the minimum current speed and depth necessary to deposit quartzite on the Cypress Hills planation surface.[23] He concluded a minimum current speed of 68 mph (108 kph) and a minimum current depth of 180 feet (55 m). His calculations are presented in Appendix 9.

Non-Cypflax Gravels (in-depth section)

There are two lower planation surfaces on the High Plains, mainly close to the Rocky Mountain Front east of the divide (see Figure A9.1). Low-grade quartzite gravel commonly carpets these planation surfaces and can be traced to their source in the Belt-Purcell rocks of the eastern Rocky Mountains. The rocks on the planation surfaces are not necessarily well rounded, but can vary from rounded to subangular (showing some sharp edges). The significance of the degree of rounding or lack thereof, is an indication they traveled only a short distance. This is what we expected since the planation surfaces are close to the eastern edge of the Rocky Mountains. The longer the transport, the more rounded a rock becomes.

Figure 14.10. Scratched rock from in the "Kennedy drift," which is a debris flow deposit.

Just east of Waterton Lakes and Glacier National Parks, we found thick piles of gravel with a lot of fine-grained particles and small rocks between larger rocks. The top of these gravels represents a planation surface correlated to the Flaxville plateaus to the east (Figure 14.1). These gravel piles were once continuous, but have been whittled down to erosional remnants that form high foothills east of the parks (see Figure 37.3). The gravel

[23] Klevberg, P. and M.J. Oard, 1998. Paleohydrology of the Cypress Hills Formation and Flaxville gravel. In, Walsh, R.E. (editor), *Proceedings of the Fourth International Conference on Creationism*, technical symposium sessions, Creation Science Fellowship, Pittsburgh, PA, pp. 361–378.

on top of sedimentary rocks are up to 260 feet (80 m) thick and are considered glacial deposits from about ten ice ages around 2.5 million years ago, according to uniformitarian reckoning. Even interglacials are claimed between glacials based on supposed paleosols, buried ancient soils. The gravels are called the Kennedy Drift, drift being an old term for glacial debris. We have analyzed this gravel and found very poor evidence that it is from a glacier,[24] and believe that the deduction that these "paleosols" separate interglacials from glacials is unsupported by the evidence.[25] About the only evidence of glaciation is scratched rocks (Figure 14.10). Rocks can be scratched by several different processes besides glaciation, such as landslides and other mass flows (see Appendix 10 for a description of the types of mass flows).[26] There are a number of reasons why the deposit is most likely a giant landslide that moved east off Glacier and Waterton Lakes National Parks.[27] The gravel becomes more rounded further to the east and by the time it is found north of Cut Bank, just south of the Del Bonita border station, it is even more rounded and caps the third from the top planation surface (Figures 14.11 and 14.12).

Figure 14.11. Flat surface of Alden's Number two bench at the Del Bonita border station, north of Cut Bank, Montana.

Figure 14.12. Close up of the gravel cap in Figure 14.11. Most of the rocks are low-grade quartzite rocks from east of the continental divide.

South of Glacier National Park and just onto the High Plains are a number of dissected planation surfaces.

[24] Klevberg, P. and M.J. Oard, 2005. Drifting interpretations of the Kennedy gravel, *Creation Research Society Quarterly* 41(4):289–315.

[25] Klevberg, P., M.J. Oard, and R. Bandy, 2003. Are paleosols really ancient soils? *Creation Research Society Quarterly* 40(3):134–149.

[26] Oard, M.J., 1997. Ancient Ice Ages or Gigantic Submarine Landslides? *Creation Research Society Monograph Books*, Creation Research Society, Chino Valley, AZ.

[27] Klevberg, P. and M.J. Oard, 2005. Drifting interpretations of the Kennedy gravel. *Creation Research Society Quarterly* 41(4):289–315.

A typical example is the Fairfield Bench, it is about 90 miles (140 km) long and lies in an east-west direction located northwest through northeast of Great Falls, Montana. This is the second to the last planation surface on the High Plains (see Figure A9.1). The eastern part of this planation surface inspired William Morris Davis to construct his popular, but now defunct, "cycle of erosion" or "geographical cycle" (see Volume II)[28] The lowest planation surface in the Great Falls area is a small gravel-capped bench along the southern portion of the Fairfield bench (see Figure A9.1). It was from a gravel deposit on this bench Klevberg deduced that rapid currents moving in excess of 34 mph (54 kph) deposited the gravel (see Appendix 9).[29]

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[28] Crickmay, C.H., 1974. *The Work of the River: A Critical Study of the Central Aspects of Geomorphology*, American Elsevier Publishing Co., New York, NY, p. 171.

[29] Klevberg, P., 1998. The Big Sky Paving gravel deposit, Cascade County, Montana. *Creation Research Society Quarterly* 34(4):225–235.