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R. F. Legget

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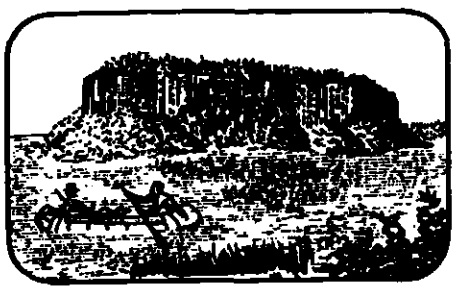

The History of Canadian Geology

Sir Alexander Mackenzie and Geology

R. F. Legget
531 Echo Drive
Ottawa, Ontario K1S 1N7

Sir Alexander Mackenzie is one of the best known of early Canadian explorers if only because the great river which he explored now carries his name. He was also the first man to cross the North American continent from Atlantic to Pacific, a fact of some surprise to those who have mistaken ideas about the Lewis and Clark expedition. The judgement of Bernard de Voto (1952) - that Mackenzie "has no superior in the history of American exploration" - seems to be well justified.

Despite their number and variety, writings about Mackenzie have not, until recently, given a well-rounded measure of the man. This is now fortunately available through the recent publication of *The Journal and Letters of Sir Alexander Mackenzie,* edited with a fine introduction by Dr. W. Kaye Lamb (1970). The record, in Mackenzie's own words, of his journey to the Pacific through the mountains makes even his voyage of discovery down, and up, the Mackenzie River seem tame by comparison. One of the surprises that a rereading of his journals provides is his attention to geological features along the routes he followed.

Surprise increases when one sees what limited schooling he had. Born in Stornaway, Scotland, in 1763, he was brought to New York by his father when he emigrated in 1774, arriving a few months before the outbreak of the American Revolution. His father joined the Royalist forces, the boy being left in *the care of two aunts who had also come* across from Scotland. Concerned about his welfare as the fighting developed, they sent him to school in Montreal in 1778. Mackenzie himself relates that in 1779 he joined "the counting house of Mr. Gregory", then being 16 years old (Lamb, *op. cit.*, p. 3).

Thereafter he remained in the fur trade, making his journey down the Mackenzie in 1789 (at 26), and to the Pacific in 1793. Between the two great journeys he returned to England since he "felt myself deficient in the sciences of astronomy and navigation", his visit to London being made "to procure the one and acquire the other." (Lamb, *op. cit.*, p. 20). One can only conclude that he obtained his remarkable general knowledge, and so some insight into geology, from the talks of the fur traders to which he would have listened while engaged on office work in Montreal. This experience would have been extended after he started his own canoe journeys with a visit to the fort at Detroit in 1784 (Lamb, *op. cit.*, p. 4).

In the published version of his journals, Mackenzie included a *General History of the Fur Trade from Canada to the North-West,* part of which is a vivid account of a journey by canoe to the Mackenzie valley. Dr. Lamb confirms that he was assisted in this, probably extensively, by his cousin, Roderick Mackenzie, and also by David Thompson (Lamb, *op. cit.*, p. 33). Alexander Mackenzie published it as his own, however, and so some extracts from this part of his famous book will be given as well as from his own travel journals.

In his own short Preface, Mackenzie says that he does "not possess the science of the naturalist" and that he "could not stop to dig into the earth, over whose surface I was compelled to pass with rapid steps" but that "a cursory *account of the soil, the course and* navigation of lakes and rivers . . . is all that can be reasonably expected from me." (Lamb, *op. cit.*, p. 58) Early in the record he states that "there is hardly a foot of soil to be seen from one end of the French river to the other, its banks consisting of hills of entire rock." (Lamb, *op. cit.*, p. 91). He observes, however, at the portage of the Chaudière des François that "it must have acquired the name of Kettle, from a great number of holes in the solid rock of a cylindrical form, and not unlike that culinary utensil. They are observable in many parts along strong bodies of water, and where, at certain seasons, and distinct periods, it is well known the water inundates; at the bottom of them are generally found a number of small stones and pebbles. This circumstance justifies the conclusion, that at some former period these rocks formed the bed of a branch of the discharge of this lake, although some of them are upwards of ten feet above the present level of the water at its greatest height." (Lamb, *op. cit.*, p. 91).

That this appreciation of the probability that water levels could have been higher in the past than as he saw them was no mere passing thought is *indicated by Mackenzie's comments on* Lake "Winipic". "This lake, in common with those of this country, is bounded on the North with banks of black and grey rock, and on the South by a low, level country, occasionally interrupted with a

ridge or bank of lime-stones, lying in stratas, and rising to the perpendicular height of from twenty to forty feet; these are covered with a small quantity of earth, forming a level surface, which bears timber, but of a moderate growth, and declines to a swamp. Where the banks are low, it is evident in many places that the waters are withdrawn, and never rise to those heights which were formerly washed by them." (Lamb, *op. cit.*, p. 113-114).

Sedimentation processes did not escape his attention. Proceeding up the Saskatchewan River he comes to Mud Lake which "must have been formerly a part of the Cedar Lake, but the immense quantity of earth and sand, brought down by the Saskatchiwine, has filled up this part of it for a circumference whose diameter is at least fifteen or twenty miles: part of which space is still covered with a few feet of water. . . It is, indeed, more than probable that this river will, in the course of time, convert the whole of Cedar Lake into a forest." (Lamb, *op. cit.*, p. 115).

Once in the Mackenzie Valley, canoe travellers came down the Clearwater River, passing its junction with the Athabasca and "At about twenty-four miles from the Fork, are some bituminous fountains, into which a pole of twenty feet long may be inserted without the least resistance. The bitumen is in a fluid state, and when mixed with gum, or the resinous substance collected from the spruce fire, serves to gum the canoes. In its heated state it emits a smell like that of sea-coal. The banks of the river, which are there very elevated, discover veins of the same bitumenous quality." (Lamb, *op. cit.*, p. 129). More efficient use of the Athabasca Tar Sands than for repairing canoes have since been developed.

Even though deposits of copper had been known from the time of Champlain, Mackenzie's references to metallic ores and similar resources are somewhat brief. When describing the north shore of Lake Superior, however, he observes that the low-lying shore to the east of Thunder Bay, and the associated islands "seems to have been caused by some convulsion of nature, for many of the islands display a composition of lava, intermixed with round stones of the size of a pigeon's egg. The surrounding rock is generally hard, and of a dark blue-grey, though it frequently has the appearance of iron and copper." (Lamb, *op. cit.*, p. 95). He noted the salt deposits along the Slave River where there are "very strong salt springs, which in the summer concrete and crystallize in great quantities." (Lamb, *op. cit.*, p. 413). Beyond this, however, he also saw that on the Slave River "the West side is faced with rocks of this stone (a soft rock of lime-stone) thirty feet perpendicular; while, on the East side, the rocks are more elevated, and of a dark-grey granite." (Lamb, *op. cit.*, p. 413). Geological maps of today reflect his observation.

Mackenzie's record of the burning coal seams on the east bank of "his" river, just upstream of Fort Norman, is often mentioned. Here are his words: "As we approach'd we found a sulpherous Smell & upon our coming to the first found that the whole Bank was on Fire for a considerable Distance; that it is a Coal Mine. The Fire had communicated to it from an old Indian Campmt. The Beach is covered with Coals. The English Chief gather'd some of the softest he cou'd find to dye Black. He says it is with this the Natives colour their Quills Black." (Lamb, *op. cit.*, p. 219). The coal is still burning although recent landslips have limited the extent of the exposure. Some distance upstream of the burning coal, Mackenzie had observed that: "In other Places the Bank of the River is high of Black Earth and Sand continually tumbling, in some parts shows a face of solid Ice, to within a foot of the Surface." (Lamb, *op. cit.*, p. 217). Those who travel on the great river today see exactly the same evidence as their introduction to this condition of the ground, now called Permafrost.

Mackenzie's *Voyages* was published in December 1801 in London, England, as a fine quarto volume; it quickly attracted much attention. Thomas Jefferson purchased a copy of the third American edition. A French translation was prepared from a smuggled copy to aid in the preparations for Napoleon's contemplated attack on Canada by way of the Mississippi. The book was clearly read by most of the northern explorers of the early nineteenth century before they set out on their hazardous journeys. It is possible that Mackenzie's geological observations may have stimulated some of these later travellers in helping to lay the foundations of the steadily increasing knowledge of the geology of Canada.

References

De Voto, Bernard, 1952, The Course of Empire: Boston. p. 309.

Lamb, W. Kaye, ed., 1970, The Journals and Letters of Sir Alexander Mackenzie: Cambridge (for the Hakluyt Society).

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