

waterworn. The benches present every variety of elevation, one above another, from 3 feet to 300 feet. Ample, and too painful, opportunity is afforded the traveller for examining their materials, stratification, and thickness in sections of these benches, as the trail continually ascends and descends the too frequent gullies and chasms, formed some by the rush of the melted snows in early summer; scooped out, however, probably in many cases by much more abnormal and potent cataclysms, the bursting of some lake in recent times. The stratification appears to have been in some cases horizontal, in others in great whirls, always as if taking place in water, at rest or in motion.

On the other hand, if at Glen Roy there are but two or three benches 20 miles long—and the benches here are but a mile or two in length in general—there are in British Columbia not two or three, but an infinite multitude of such benches scattered over a tract certainly more than 100,000 square miles in extent. Almost in every case where benches occur, there are one or more—occasionally ten or a dozen—between the rivers and the base of the nearest hill; and similar benches, similarly irregular in number, on the opposite side of the river, one, or more, of which is almost certain to correspond in level with one, or more, on the spectator's side. But the changes on the river-banks are so frequent from the violence, and often the very sudden changes of violence, of the streams, from the frequent land-slips, and, in my opinion, from the gentle but continued upheaval or depression of the surface, that the corresponding bench on the opposite side of the river is often found to be wanting: sometimes many benches seem to have been swept away at once.

I have everywhere noticed that the highest benches are near the highest mountains and the most violent streams, in positions where the effect of some subsequent flood would be most likely to obliterate all traces of its predecessor, or else where volcanic agency is not disguised. But, generally speaking, on the Upper Fraser, where the stream runs less violently, and where there are only hills, no mountains—and those generally at some little distance from the river—the benches are more regular, and vary only by a few feet in level.

Wherever two benches meet, with rare exceptions, they are sharply defined by a bank or cliff at an angle of  $45^\circ$ , exactly similar to that by which the lowest bench falls on the river or lake which bounds it, and apparently formed in the same way, *i.e.* by the action of water alongside.

The benches are to all appearance in their normal state, level in

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