

*Morainal Material.*—Drift covers the whole Bow valley up to the base of the mountains. At the Bow river the bluffs rise 125 feet above it, and consist of typical boulder clay throughout. The river itself rests on this material, and shows no bed rock at this point. The new waggon road follows the outlet stream from Lake Louise, and gives some good sections. The stream itself has cut down as much as 100 feet in many places through the boulder clay. Many fresh pebbles and boulders were turned out in the construction of the road, which are about equally of limestone and quartzite; most all the boulders show rounding and striations on one or more sides. The largest piece was a great slab 25 feet long by 8 feet wide, and from 3 to 4 feet thick. The whole surface of the Bow valley up to Lake Louise is plainly a series of moraines. The present chalet is built on one, which makes the dam to the lake, and all the way to the Bow river there is a succession of nearly parallel ridges, presumably left by a fan-shaped extension of the Louise glacier as it retreated, and after the general glaciation of the Bow valley had disappeared. It appears that there was a long pause at the gap, during which time the glacier piled up two or three hundred feet of morainal material, and formed a dam to its own waters after it retreated. A glance at the contour map of the lake shows, from its great depth, how much material must have been transported in order to so completely choke the end of the valley. A tendency to submarine moraines is suggested by the contours at the head of the lake. The terminal moraine of the existing glacier lies about one mile south of the lake, and some 600 feet above it. The piles of moraine are about 700 feet in width, and average fully 150 feet in depth—an immense mass of material, but not at all surprising after a glance at the glacier itself, which for a mile from its snout is so thoroughly covered with *débris* as to completely conceal the ice. Some of the boulders on the glacier were calculated to weigh from 35 to 40 tons. Immediately beyond the present moraines, which have a very recent and fresh appearance, the landscape is often forest-clad, and the boulders have an aged appearance, entirely different from the oldest boulders of the moraine. When we take these points in connection with the fact that nothing that might be styled a moraine exists between the lake and the present terminal moraine, we may conclude that the retreat of the glacier from the lake-bed to its present position was too rapid and uniform to leave any traces of terminal moraines. The fact is evident, from a study of many glaciers in the Rocky mountains, that the existing glaciers are now nearly as large as they have ever been since their final retreat in the great Ice age. This is contrary to the almost universal retreat of the glaciers in Switzerland, Norway, and Alaska. Nevertheless, Dawson notes that there are universal indications of increased humidity and rainfall in this part of the Rockies, such as abnormal height of lakelets without outlets, which has killed a belt of trees on their borders—evidence of recent floods