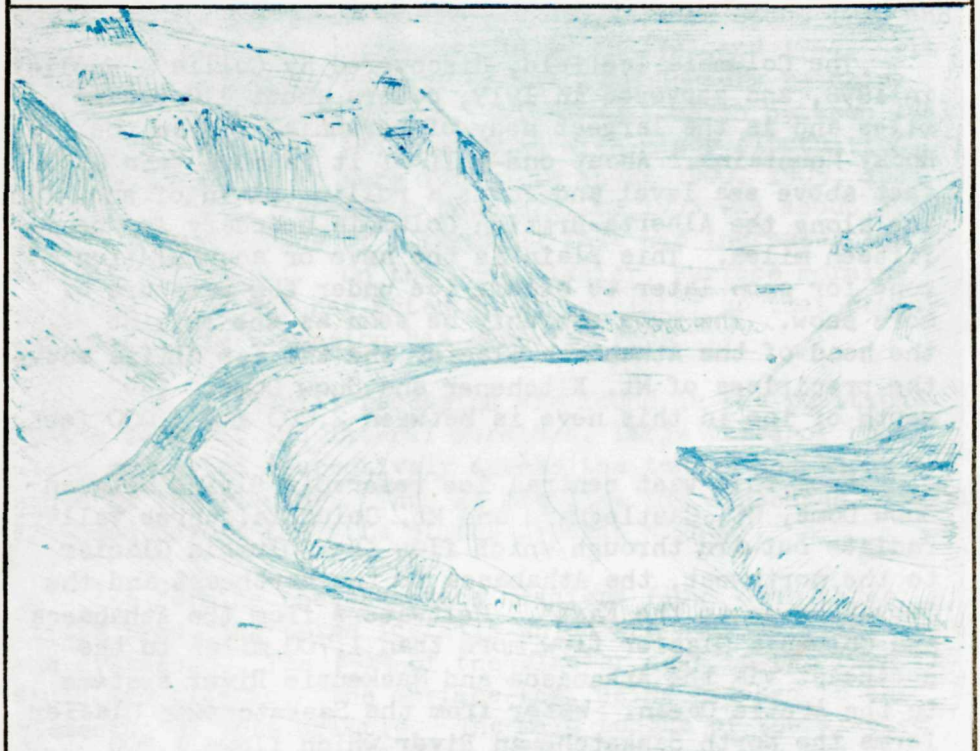
NATURE NOTES

Athabasca Glacier - Columbia Icefield



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The Columbia Icefield, discovered by Collie & Woolley in 1898, and surveyed in 1919, covers about 110 square miles and is the largest body of perennial ice in the Rocky Mountains. About one-half of it is more than 8,500 feet above sea level and forms a rolling plain of snow and ice along the Alberta-British Columbia boundary for nearly fifteen miles. This plain is the neve or accumulation zone for snow later to become ice under the pressure of more snow. The neve can only be seen as the skyline of the head of the Athabasca Glacier and the ice cliffs above the precipices of Mt. Kitchener and Snow Dome. The depth of ice in this neve is between 2,000 and 3,000 feet.

From this vast central ice reservoir "lying between Snow Dome, Mt. Castleguard and Mt. Columbia, three valleys radiate outward through which flow the Columbia Glacier to the northwest, the Athabasca to the northeast and the Saskatchewan to the East". Meltwaters from the Athabasca and Columbia Glacier flow more than 1,700 miles to the northeast via the Athabasca and Mackenzie River systems to the Arctic Ocean. Water from the Saskatchewan Glacier forms the North Saskatchewan River which flows 1,200 miles to empty into the Hudson Bay. Waters from the western slopes of the icefield feed tributaries of the Columbia River System near its "Big Bend". The Columbia River flows 1,200 miles to the Pacific Ocean at Astoria, Oregon.

The size of a glacier is determined by the balance between the rate at which ice forms in and flows from the neve and the rate of recession or melt at the tongue, sides and surface. This balance is delicate and the fluctuations

of glaciers is an indication of climatic variations. Most glaciers in the Rocky Mountains are in a state of recession brought about by a slight increase in mean annual temperatures; perhaps there has also been lower rates of precipitation and longer periods of sunshine in the mountains. "The Athabasca Glacier reached its maximum advance about 1714 and withdrawal began in different places in 1721 and 1744. It readvanced in the first half of the 19th Century reaching almost to its maximum extent. Withdrawal began between 1841 and 1866. Recession has continued with minor fluctuation. Recessional moraines were formed in about 1900, 1905, 1925 and 1935. Total recession from 1721 to 1953 was about 3,600 feet". The presence of a terminal lake has increased the rate of withdrawal. On the Dome Glacier, surface moraine (ablation moraine) has acted as an insulator so that comparatively little recession has occurred recently.

Clues to glacial recession are found in the positions of the terminal and lateral moraines, large piles of rock waste deposited respectively across the tongue and along the sides of the glacier. Thus at one time the Athabasca Glacier extended beyond the site of the present highway.

Ice forming the Athabasca Glaciers flows over three cliffs producing three icefalls which are heavily fractured and crevassed. The part of the glacier next to the rock is fluid and plastic. The surface ice, being exposed to the elements, is more brittle. The main tongue of the glacier fills a great "U-shaped" valley, which it has created, to a depth of 1,000 feet, with a gradual thinning towards its terminus. The glacier is wider than it looks at the lower end since it extends well under the dark rubble on each side, especially on the north side.

Rock flour or glacial silt in suspension determines the colour of our lakes and rivers. It results from the grinding action of the ice on the rocks over which the ice flows, and is carried by the meltwaters to the creeks, rivers and lakes. (Notice the lake at the tongue of the glacier.)

Reference - for further information consult
Mercer, John H., 1958 - Geographic Study of Mountain Glaciation in the Northern Hemisphere.
Part 2 b Western Canada and Arctic Canada.
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New York. Chap. 2.