

in these places the ice can have no marked or at least rapid erosive power. The preservation of detritus below the ice seems generally to arise from flatness of the ground, thinning away of the ice, or some other local cause sufficient to indicate that the glacier cannot there act with erosive effect.²⁴⁶

Hardly anything has yet been done in the way of actual measurement of the rate of erosion by different glaciers. An approximation to the truth might be obtained from the abundant fine sediment which, giving the characteristic milky turbidity to all streams that escape from the melting ends of glaciers, is an index of the amount of this erosion. The average quantity of sediment discharged from the melting end of a glacier during a year having been estimated, it would be easy to determine its equivalent in the precise fraction of a foot of rock annually removed from the area drained by the glacier.

From the end of the Aar glacier (which with its affluents is computed to have an area of 60 square kilometres, and is therefore by no means one of the largest in Switzerland) it has been estimated that there escape every day in the month of August two million cubic metres (440 million gallons) of water, containing 284,374 kilogrammes (280 tons) of sand. The amount of fine sand discharged from the melting glacier into the fjord of Isortok, Greenland, is estimated at 4062 million kilogrammes per day.²⁴⁷ Mr. A. Helland has computed that from the Justedal glacier, Norway, one million kilogrammes of sediment are discharged in a July day, and that the total annual discharge from the ice-field, 830 square miles in area, amounts to 180 millions of kilogrammes, besides 13 million kilogrammes of mineral matter in solution. Taking the specific gravity of the suspended matter at 2.6, he finds that the basin of the glacier

²⁴⁶ For a striking example of the way in which a glacier may spread over deposits of gravel, see the plate accompanying Mr. H. P. Cushing's paper on the Muir Glacier of Alaska, *American Geologist*, 1891.

²⁴⁷ *Meddelelser om Grönland*, vol. ii.