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? WHY THE WEATHER ? Mailed September 22,1927

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THE GLACIER AS A WEATHER INSTRUMENT

The "fronts," or lower ends, of mountain glaciers do not remain stationary. Their positions vary with the season of the year and are also subject to irregular variations, forward or back, which tend to persist in one direction for several years. Many glaciers in different parts of the world are now under regular observation. Some are measured annually, and others at more frequent intervals. Statistics of the advance and retreat of glaciers are published by the International Glacier Commission and other agencies.

Since glaciers vary in size under the influence of atmospheric conditions, records of the kind just mentioned have often been analyzed in the search for climatic "cycles," but they are found difficult to interpret. A glacier is a meteorological instrument that measures several weather elements at the same time by a single process of expansion and contraction. It is fed mainly by snow and depleted mainly by melting and evaporation. Thus it is a snow-gauge, thermometer and evaporimeter -- besides a few other things.

The length of a glacier has been found to depend upon the speed at which the ice moves down from the snowfields, and this speed, in turn, increases with an increase in the thickness or depth of the ice. If the thickness of a glacier is well above its average, and the front is consequently advancing, a single hot summer will not melt it enough to stop the advance, but a series of several hot summers will have this effect. A large increase in the amount of snow at the source of the glacier is also slow in registering its effects. Altogether a glacier is a crude and sluggish instrument, yet the combined records of many glaciers extending over long periods of years do seem to reveal some outstanding fluctuations of climate.

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