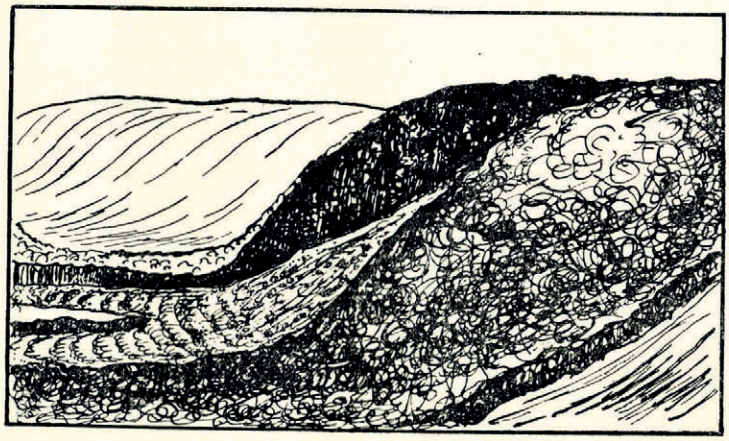
CORRESPONDENCE

The Editor,
The Journal of Glaciology

SIR,

Ogives in Lava Streams

I have read with interest the report of the Conference on the terminology of Glacier Bands in the April 1953 issue of *The Journal of Glaciology*. I think it might be of interest to point out in this connection that ogives are not a surface feature limited only to glaciers. They are also formed in lava flows. While studying the latest eruption of Hekla in 1947 I several times observed such ogives *in statu nascendi*. I enclose a sketch taken from my diary of 11 May 1947. The lava stream was at this place flowing down a slope of about 15 degrees between high embankments of new lava; just beneath the slope the stream was 35–40 m. broad. The rate of movement in the middle of the stream on the day in question was 0·1 m./sec., decreasing towards both margins. The depth of the stream may be estimated at 2–3 m. The surface layer of the stream, 0·2–0·3 m. in thickness, consisted of a conglomerate of more or less solidified lava lumps and blocks of different sizes. This surface layer merged without any sharp limit into fluid viscous lava. According to measurements by the Icelandic physicist T. Einarsson the viscosity of this flowing lava is of the order of 10^5 poises. The flow must be regarded as laminar. The sketch shows how the ogives are formed just below the lava fall, and nowhere did I observe the formation of lava ogives except below rather steep lava falls. The ogives may be characterized as low waves on the surface of the lava stream. These waves were gradually smoothed out with increasing distance from the lava fall, and within a kilometre or so they had disappeared.



The formation of lava ogives seems to be a phenomenon encountered in the flow of viscous material down slopes and the damming up of the surface material at the foot of the slope so as to block its passage for a period of time or until the pressure has reached a certain amount. It then moves away the blocking material and new damming-up starts.

The enclosed sketch is strikingly similar to the picture of the ogives on Triftgletscher in the Bernese Oberland published by R. Streiff Becker in the *Zeitschrift für Gletscherkunde und Glazialgeologie* (Bd. 2, Ht. 1, 1952, pp. 1–9). But the formation of lava ogives speaks rather against his interpretation of the ogives as due to extrusion flow, as the viscosity of the lava in all probability does not decrease towards the bottom of the lava streams. In a previous paper (*Jökull*, 2. ár, 1952) I have pointed out that the distance between ogives formed below the ice falls of some of the Öræfajökull outlet glaciers seems to correspond roughly to the annual rate of movement of the glaciers. I suggested that these ogives might be due to some regular rhythm in the rate of flow or transport of material down the slopes and thus be annual, although certainly not due to annual stratification in the accumulation area. The above-mentioned formation of lava ogives shows that such annual rhythm is not requisite for the formation of ogives, but this does not exclude the possibility that the Öræfajökull ogives are really annual.

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