

The Editor,  
*The Journal of Glaciology*

SIR,

*Sand Pillars*

The sand pillar illustrated in the photograph, Fig. 2, p. 438, was found on the medial moraine of Tverråbreen in Jotunheimen, some 500 m. from the glacier snout. It consists of stratified sand which had been deposited in a melt hole in the ice. As these pillars melt out of the ice the sand often pours down and an unstratified heap of material builds up around their feet. When the ice has disappeared one generally finds only a conical heap of sand which may or may not have a stratified centre. It is to be expected that the remnants of these sand-filled holes would be more common on stationary dead ice than on moving glaciers. It is possible that they may explain some of the isolated sand cones in dead ice landscapes from the Ice Age.

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SIR,

*Snow Rollers*

Some unusual snow formations occurred at the Montreal Road Laboratory site of the National Research Council of Canada, near Ottawa, during a storm on 23 November 1949. The same phenomenon was also observed at Rockcliffe Airport and the Dominion Experimental Farm at the same time. The former is located approximately one mile, and the latter six miles, from the Laboratory site. The formations are illustrated in Figs. 1 and 2, p. 458. The average wind velocity was approximately 20 m.p.h. (8.9 m./sec.) from the south. The air temperature was  $+10^{\circ}$  C. The snowfall comprised wet clusters of stellar crystals. The average diameter of a cluster was approximately 15 mm. Surface crystals were lifted by wind action. They did not, however, become disaggregated because of the strong cohesion caused by the high temperature. Nevertheless, the resultant accumulation was light enough to be rolled by the wind. Density determinations of the structures yielded an average value of 0.07 gm./cc. This value is probably too large due to unavoidable compression during sampling. Snow was continuously added with forward movement. The motion persisted until either rolling friction became too large or a surface irregularity was encountered. The largest structures were approximately 35 cm. in diameter and 35 cm. in length. Soon after the storm the air temperature dropped and did not rise above freezing point for six days. The mounds were visible for several days.

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 22 February 1950

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[A description of snow rollers was published in the *Quarterly Journal Royal Meteorological Society*, Vol. 34, No. 145, 1908, p. 87-88, followed by descriptions of similar phenomena by a number of well-known meteorologists, including Alexander Buchan, G. J. Symons and Wilson A. Bentley (Jericho, Vt.).—*Ed.*]