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Unusual snow patterns on a frozen lake, northern Norway

While carrying out field work on the glacial lake Austerdalsvatnet in the Svartisen area of northern Norway between 23 April and 23 May 1980 an interesting pattern was observed on the frozen surface. The lake was frozen, the ice thickness being 1.7 m, and snow covered the entire surface to a depth of 20 cm. Prior to the pattern appearing there had been ten days of strong sunshine and only a few nights of freezing. At the end of this period there were two days of strong winds from the west with showers of light



Fig. 1. Photograph of lake's frozen surface. Scale is 1 m.



Fig. 2. Photograph showing detail of the pits. Wind was from right to left.

rain. The pattern shown in Figure 1 was produced during the two days of wind and detail of it is shown in Figure 2. The whole surface of the lake was covered by this feature and it was not restricted to any area with a different topography. If the entire surface had not been covered by these pits they would appear to have been hoof-prints. The wind direction was from right to left on Figures 1 and 2 and the shape seems to be the result of wind scour. Seligman (1936) describes a similar feature which he calls a perforated crust and suggests that it is caused by the Sun (p. 130). He considers that the Sun acts most powerfully on small depressions in the snow surface as the rays are concentrated into them. The pits become evaporated on the side opposed to the Sun's noon-day position, and hot, still conditions accentuate the inequalities to produce pits. As Figure 2 shows, however, the pits found on the lake occur in pairs with great regularity, which suggests that some agent other than the Sun is involved. The depth of the pits was about 1 cm and there were no associated topographical features such as icebergs which could have produced localized turbulence to scour the surface. Why this pattern has emerged with such regularity is difficult to explain, and I should be grateful if anyone who has observed this pattern elsewhere can shed some light on its development.

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REFERENCE

- Seligman, G. 1936. *Snow structure and ski fields: being an account of snow and ice forms met with in nature and a study on avalanches and snowcraft*. London, Macmillan and Co.